

GENETIC PSYCHOLOGY MONOGRAPHS

Child Behavior, Animal Behavior,
and Comparative Psychology

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SEX DIFFERENCES IN VARIATIONAL TENDENCY*

From the Department of Psychology of Stanford University

By

QUINN MCNEMAR AND LEWIS M. TERMAN

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I

INTRODUCTION

In all sex comparisons, whether these are concerned with intellectual, physical, or personality traits, we are interested not only in the comparison of the central tendencies of the sexes with respect to the trait in question, but also in differences that may exist with respect to variability. Since Darwin, a considerable amount of evidence has been cited in support of the theory that in many animal species the male is characterized by greater variability than the female, and scientists have not been lacking who were ready to generalize such observations into a universal law.

Whether or not the alleged law of greater male variability holds generally among animal species is beyond the scope of this paper, which is limited to an examination of the available evidence on the relative variability of boys and girls and of men and women in mental and physical traits. We are interested primarily in comparisons of variability with respect to mental traits, but in view of the fact that inferences from the physical to the mental are difficult to resist, it seems desirable to consider also the results of a variety of physical measurements.

The first serious study of sex differences in variability among human beings was that of Havelock Ellis (21) published in 1894. Previous to that time the question had been treated discursively by many writers,

of whom most accepted the theory of greater variational tendency on the part of the male. However, the total amount of evidence which they had to offer in support of this contention was not very impressive. The treatment of the subject by Ellis was based upon rather careful examination of the medical, anthropometric, and psychological data at that time available. He cites extensive data from the literature of pathology indicating a higher incidence of mental deficiency, insanity, and many kinds of congenital physical defects among males and, coupling this with the known fact that in all ages and among all races men have achieved notably much more often than women, he was led to conclude that there is unquestionably greater variability in the male.

Since the appearance of the study by Ellis numerous criticisms have been made both of his conclusions and of his methods. It has been argued that the greater achievement of males can be fully accounted for on the basis of a differential environment, and that the apparently higher incidence of feeble-mindedness in the male may be explained by the fact that the male, because of his occupational responsibilities, is more likely to be committed to an institution for defectives than is the female of equal grade of mental subnormality. The female is favored by the fact of greater docility, which makes her home care more feasible, and by the economic possibilities she finds in prostitution if she is above the level of obvious imbecility. Hollingworth (34, 36) has in fact shown that in New York City mentally defective women actually do es-

cape detection more readily than men, and that male defectives committed to an institution are on the average less retarded mentally than women who are committed. Even a fairly low mental level does not prevent the woman from engaging in routine domestic service, or, if her appearance is passable, from marrying or making her living by prostitution. The man of equal retardation finds it difficult to hold a job and is more likely to become delinquent or to be adjudged defective. Such conditions certainly help to explain the excess of males over females in institutions for defectives; that they account for it fully has not been established.

In 1897 Karl Pearson (48) severely attacked the methods and conclusions of Ellis as "pseudo-scientific." Pearson redefined the problem so as to limit it to sex difference in a normal population with respect to traits objectively measurable and subject to statistical investigation. When he sought such material he found only physical and anthropometric data available for his use. His treatment of these data disclosed slightly less variability in males than in females, and he therefore concluded that he had disposed of the "superstition" which Ellis had done so much to propagate. Ellis later replied (22) defending his own position and attacking the methods used by Pearson, especially the proposal of the latter to rule out abnormalities.

In reality Pearson and Ellis have approached the problem largely from different angles. What is true of variability with respect to height, for example, may or may not be true of variability with respect to inci-

dence of physical abnormality. What is even more important, we can safely infer little or nothing about variability in mental traits from variability in physical traits; too little is known about the relationship between mind and body. The net result of the controversy is that neither Ellis nor Pearson has proved either the presence or absence of a sex difference in variability with respect to psychological traits. Thorndike, in a later review of the evidence (64, 65), has aligned himself rather definitely on the side of Ellis as a believer in the law of greater male variability. While the data he presents are on the whole favorable to this theory, they are too inconsistent to be entirely convincing. As a matter of fact, Hollingworth's more thorough-going summary of the literature (35), almost immediately following that by Thorndike, presents about as much evidence on one side of the question as on the other. There are few problems in psychology on which investigations that would appear to be comparable have yielded results so discordant, a fact which makes it necessary for us to give considerable attention to the techniques that have been employed in the comparison of variability.

II

PROBLEMS OF TECHNIQUE

In connection with the problems of technique it is necessary (1) to formulate a working definition of variability, (2) to decide what traits or characteristics are to be treated, (3) to make clear the requirements with regard to size and selection of populations, and (4) to consider the relative satisfactoriness of the available statistical measures of variability.

For our present purpose we shall adopt the usual statistical definition of variability; that is, so-called abnormal cases will not be ruled out, but will be regarded as the frequencies making up the extremes of a distribution of individuals for the trait under consideration. The definition we have laid down is the one which permits the greatest possible use of quantitative methods while at the same time permitting the inclusion of available data concerning the incidence of mental deficiency, insanity, and genius.

In the selection of traits to be considered there are certain limitations which must be observed. For example, it would be unreasonable, as Pearson has pointed out, to select traits which are of the class commonly designated as secondary sex characters. However, Pearson's exclusion of so-called abnormalities seems to us not well founded. On the other hand, traits like muscular strength and chest expansion, which are known to be greatly influenced by the differing environment of the sexes, will be ruled out. All kinds of mental ability tests and tests of achieve-

ment are to be included whenever they meet the minimal requirements that will be laid down in connection with the discussion of sampling and statistical measures of variability. Considerable space will be given to anthropometric data, partly because of their objectivity and reliability, but the reader should bear in mind that such data throw no direct light on variability in psychological traits. It is the latter with which we are here primarily concerned. Though we shall deal at length with data from mental tests, this does not mean that such data are entirely satisfactory for use in comparing the variability of sex groups.

Three questions must always be raised concerning a measured population: (1) Is the sample large enough to yield reliable data? (2) Have selective factors entered to affect the character of the sample? (3) If selection has occurred, has it been differential according to sex? In many published investigations, conclusions have been based upon populations too meager and too faultily selected to yield data of any value whatever. What dependence, for example, can be placed upon conclusions drawn from the measurement of ten or twenty college students of each sex who happen to be available and are used without regard either to the factors that have determined their selection from the general body of students or to the factors, perhaps differential for sex, that have determined the nature of the general student body of the college in question? Yet conclusions based upon such data have been quoted and requoted as evidence on the relative variability of

the sexes. It may be argued that when the data accumulated from many small samples are fairly consistent in the trend of their results, the evidence they offer may be regarded as reliable. This is true only in case we can be sure the samples have not been influenced by selective factors consistently differential for sex; as a rule no trustworthy conclusions can be drawn from such limited samplings. In this discussion we shall entirely ignore results obtained from groups numbering less than 50 for each sex and shall in fact cite few investigations involving sex groups below 100. To decide where to draw the line in regard to selection is not so easy, as practically all available samples are from populations more or less selected. Those drawn from the elementary schools probably approach an unselected population more nearly than any others; high school groups are known to be influenced by differential selection, and all college and adult samples are affected by a complicated network of selective factors. One cannot be too careful in drawing inferences regarding the population at large from data based upon school populations.

Homogeneity of the measured group is another factor that has too often been neglected. The use of a grade group in which age is not constant renders fallacious any conclusion regarding variability in a trait that happens to be correlated with age. Since nearly all traits for which data are available are correlated with age, it follows that age groups should be used instead of grade groups. It is also necessary to scrutinize carefully all so-called adult samples, as they are

often found to include subjects who are not fully adult. The factor of race must also be taken into account. Lack of information concerning selection, age, and racial homogeneity, combined with very small samples, would seem to be sufficient reason for omitting most of the data obtained by physical anthropologists from museum populations.

We may turn next to a consideration of the methods by which variability is to be measured. These have often been of the most slipshod character. For example, sweeping conclusions have been drawn from a consideration of the range alone. The 10 to 90 percentile range and the proportion of the one sex exceeding a given percentile of the opposite sex are other crude methods which have been frequently used. The quartile deviation and the average deviation are often employed instead of the more reliable standard deviation.

Besides using inefficient measures of variability, a majority of investigators have neglected to interpret their findings in terms of the theory of sampling. No matter how small the difference, so long as any difference at all has been found, it is more than likely to be followed by a positive statement that one sex is more variable than the other.

It has often been argued that the standard deviation does not give us an adequate measure of variation when two groups are being compared which differ greatly in their means. The necessity of using a relative rather than an absolute measure of variability is obvious if we are comparing, for example, elephants

and ants for variability in weight. However, when the difference between the means is small, and when, as is often the case, the sex having the lower mean has the greater absolute variability and the same or greater range, the use of a measure of relative variability is unnecessary and may even distort the facts. When we are dealing with anthropometric data on adults the means usually differ enough to suggest the need of using the coefficient of variation, but even here one cannot always justify its use. In the case of psychological and educational measurements, the lack of an absolute zero point renders invalid the use of a relative measure of variability such as Pearson's coefficient of variation.

Another statistical issue concerns the form of the distributions, the point being that two distributions may have the same standard deviation and the same range, yet differ in kurtosis. An examination of available distributions does not suggest a sex difference in this respect in school or pre-adult populations, and if found at the young adult level the question would arise whether it was not due to a sex difference in the age at which maturity is reached.

Anyone attempting to bring together the results of a number of psychological investigations must face the fact that a certain amount of the original data may be unreliable. As an illustration, we find in an otherwise excellent study the following consecutive frequencies: 70, 361, 178, 225, 55. Examination of the data gives the explanation of the bi-modal distribution: the person or persons who made the measurements simply failed to

inhibit the tendency to round off their readings—361 is the frequency for 11 cms., 178 for 11.5 cms., 225 for 12, etc. Incidentally, this study was planned as a crucial test of sex difference in variability. Again, anthropometric data are often more or less invalidated because of slackness in regard to measurement procedures; height may be taken with shoes on or off and weight may be taken with or without clothes. Even if a uniform procedure has been used with both sexes the data may still be injured for sex comparisons. An example would be measuring height with shoes on; it is probable that this would enhance the variability of the resulting measures for female groups more than for male groups. Measuring weight with the clothes on would usually have the reverse effect.

Reviewers of the literature on sex differences in variability can often be criticised for failure to indicate the size of the sample with their quoted data. When probable errors and size of samples have both been neglected, interpretation of results is of course impossible. It is because of such neglect that significance is often attached to an observed difference which can be fully explained in terms of sampling. Occasionally, also, a reviewer quotes or calculates statistical data which, on examination, are found to have been computed from a curtailed distribution; that is, a distribution obtained by the use of a test that yields undistributed measures at one extreme or the other. Certain data of Courtis (17) have been often carelessly used in this way.

Another question concerns the legitimacy of com-

binning data on unlike traits for the purpose of securing a total or composite measure indicative of the general trend. Pearson (48) combined such diverse data as measures of physical strength (a psycho-motor function), purely physical measurements, and measures yielding bodily indices, in order to obtain a single figure indicative of a general law. Surely the meaning of such a figure is very questionable. In this connection attention should be called to Pearson's overweighting of Porter's data on St. Louis school children. These data contribute 277 of the total 568 observational units in Pearson's final distribution of ratios of male to female variability. The overweighting is due, not to Porter's large population, but to the fact that these same age samples have been measured on seven different traits, namely, height, weight, chest girth, sitting-height, squeeze of right hand, squeeze of left hand, and cephalic index. Since nearly all of these traits are intercorrelated, it would naturally be expected that if a particular age group showed a greater variability for a given sex in height, it would also show for this sex a greater variability in weight, etc. It happens that the Porter data show both greater absolute and greater relative variability for the females of all five age groups on all seven traits. In combining them Pearson has not allowed for the correlational factor. If he had had available the data of Elderton (to be quoted later) wherein the variability of boys is greater than that of girls for both height and weight at three of the five age levels, and for samples twice as large as those of Porter, it is obvious that the use of

Elderton's instead of Porter's data would have brought the mean of the distribution of his variability ratios nearer unity, thereby invalidating his conclusion as to greater female variability. Furthermore, had Pearson not used the coefficient of variation he would have found greater male variability.

One could go on indefinitely piling up instances of unwarranted interpretation of data in connection with the present problem. Our purpose, however, is not primarily to criticize the labors of others, but to utilize their data in an attempt to determine, as best we can with present methods of analysis, whether a sex difference in variational tendency actually exists. It is to this task that we shall next turn our attention.

Data will be examined which have been culled from many sources. Those on anthropometric traits will be considered first, then the results of psychological and educational measurements. The data will be presented in tables in all cases in which they are sufficiently extensive and the populations sufficiently large. Each table will give the size of the sample, the means and standard deviations, the difference between the two measures of dispersion, the standard error of this difference, and the ratio of the difference to its standard error. Since the standard errors of the means and of the standard deviations are not pertinent for comparing differences in variability, they have been omitted from the tables. The necessary constants for their computation and for checking the standard errors of differences are given. Inasmuch as few investigators have furnished standard deviations with their data, we

are responsible for the computation of the majority of such measures here presented and for the computation of all differences and their standard errors.

III

ANTHROPOMETRIC DATA

Anthropometric data have a bearing on our psychological problem only in so far as it is permissible to infer the mental from the physical. For this reason it would hardly be profitable to present a complete report of available data on physical traits; we shall instead give the results of only those investigations which have utilized the largest and most reliable samples. These will serve to indicate the general trend so far as physical measurements are concerned; the smaller samples could add little to our certainty. Under ordinary conditions of sampling, a population of less than 100 is of little value beside one of 1000 or more.

In Table 1 are given the data of Boas (5) on the height of school children in several American cities. These data suggest a greater female variability at ages 11.5 and 12.5, and a decidedly greater male variability at ages 14.5 and 15.5. The data of Elderton (20) on Glasgow school children, presented in Table 2, again show a greater female variability in height at ages 11, 12, and 13, but at ages eight and 14 a larger dispersion for the males. Height of Barey (England) school children, as given by Habakkuk (31) and presented in Table 3, shows no consistent sex difference in variation except at age 12.5, where the girls are more variable, a finding consistent with the figures for this age in the other tables. Boas and Wissler (6) give data on the sitting height of children in three cities

TABLE 1
HEIGHT (IN CENTIMETERS) OF AMERICAN CHILDREN. ST. LOUIS,
BOSTON, MILWAUKEE, WORCESTER, TORONTO, AND OAKLAND
SCHOOLS. DATA FROM BOAS

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
5.5	M	1535	108.42	4.890	.203	.129	1.57
	F	1260	105.49	4.687			
6.5	M	3975	111.78	5.071	— .010	.083	— .12*
	F	3618	110.70	5.081			
7.5	M	5379	116.89	5.274	.002	.074	.03
	F	4913	116.17	5.273			
8.5	M	5633	122.05	5.595	— .010	.076	— .13
	F	5289	121.22	5.605			
9.5	M	5531	126.89	5.735	— .028	.078	— .36
	F	5132	126.13	5.763			
10.5	M	5151	131.75	6.056	— .192	.086	—2.23
	F	4827	131.24	6.248			
11.5	M	4759	136.17	6.377	— .469	.097	—4.83
	F	4507	136.57	6.846			
12.5	M	4205	140.68	6.841	— .742	.112	—6.62
	F	4187	142.54	7.583			
13.5	M	3573	145.91	7.694	.280	.128	2.19
	F	3411	148.58	7.414			
14.5	M	2518	152.14	8.682	1.952	.154	12.67
	F	2537	153.41	6.730			
15.5	M	1481	158.50	8.881	2.903	.193	15.04
	F	1656	156.45	5.978			

All computations by present writers.

*In all tables of this paper a minus sign denotes greater female variability.

(Table 4) which indicate a consistent and significant difference at age 13 in the direction of greater female variation.

It is clear from the four tables just presented that, notwithstanding the large samples involved, it is impossible to draw any final conclusion concerning sex variability in height of school children. The greater

TABLE 2
HEIGHT (IN INCHES) OF GLASGOW SCHOOL CHILDREN: DATA
FROM ELDERTON

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
5.5-6.5	M	3322	41.80	2.469	— .084	.044	— 1.91
	F	3104	41.36	2.553			
6.5-7.5	M	3901	43.60	2.632	.023	.041	.56
	F	3828	43.17	2.609			
7.5-8.5	M	4200	45.65	2.897	.205	.043	4.77
	F	3926	45.00	2.692			
8.5-9.5	M	4009	47.55	2.813	— .004	.045	— .09
	F	3817	46.93	2.817			
9.5-10.5	M	3880	49.40	2.829	— .050	.046	— 1.08
	F	3762	48.80	2.879			
10.5-11.5	M	3759	51.09	2.860	— .130	.047	— 2.76
	F	3518	50.60	2.990			
11.5-12.5	M	3632	52.80	2.946	— .167	.050	— 3.34
	F	3656	52.65	3.113			
12.5-13.5	M	3638	54.43	3.107	— .201	.055	— 3.65
	F	3224	54.84	3.308			
13.5-14.5	M	1467	56.16	3.318	.172	.075	3.29
	F	1229	56.88	3.146			

All computations by present writers.

variability of the girls at ages 10, 11, 12, and 13 is explicable on the basis of the earlier onset of puberty in the case of girls, a variable factor which does not affect the dispersion of the boys until a year or so later. The data of Woodbury (73) on height measurements of more than 167,000 preschool children presented by monthly age intervals show no consistent sex differences in variation, the mean of the distribution of ratios of male to female variability being .9987 with a standard error of .0017. However, Woodbury's data involve unknown selection and, since they were col-

TABLE 3
HEIGHT (IN INCHES) OF BAREY (ENGLAND) SCHOOL CHILDREN:
DATA FROM HABAKKUK

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
3.5	B	145	93.24	4.704	.186	.393	.47
	G	131	92.28	4.518			
4.5	B	664	96.90	4.733	.080	.187	.43
	G	600	96.31	4.658			
5.5	B	282	102.22	5.610	.178	.315	.56
	G	346	101.71	5.432			
6.5	B	363	110.36	5.584	.110	.299	.37
	G	324	109.43	5.474			
7.5	B	467	113.25	4.872	—.156	.239	—.65
	G	388	112.76	5.028			
8.5	B	861	120.14	5.722	.218	.194	1.12
	G	820	119.68	5.501			
9.5	B	692	125.00	5.772	—.318	.243	—1.31
	G	669	124.35	6.090			
10.5	B	324	128.46	6.328	.016	.349	.05
	G	333	127.37	6.312			
12.5	B	2021	138.71	6.590	—.768	.159	—1.83
	G	1893	140.57	7.358			

Computation of differences and their standard errors by present writers.

lected by many physicians throughout the country, are probably rendered unreliable by lack of uniform techniques.

Three of the above investigators also give extensive data on weight. Those of Boas and Wissler will be found in Table 5, those of Elderton in Table 6, and those of Habakkuk in Table 7. These tables, like those for height, show marked disagreements. In the upper age levels there seems to be a consistently greater female variation. This is particularly true of the data in Table 6, where the last four age levels show signifi-

TABLE 4
 SITTING HEIGHT (IN MILLIMETERS) FOR CERTAIN AGE LEVELS IN
 THREE CITIES: DATA FROM BOAS AND WISSLER

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
<i>Milwaukee Data</i>							
5	B	297	592	26	1	1.5	.65
	G	251	586	25			
7	B	641	635	26	0	1.0	0
	G	586	637	26			
10	B	553	699	30	- 1	1.3	- .77
	G	553	698	31			
13	B	365	657	35	- 5	2.1	-2.38
	G	333	785	40			
<i>Worcester Data</i>							
7	B	203	642	28	- 1	2.3	- .44
	G	129	639	29			
10	B	228	711	31	- 3	2.3	-1.29
	G	174	705	34			
13	B	224	771	39	- 3	2.8	-1.06
	G	190	788	42			
<i>Toronto Results</i>							
7	B	915	642	31	- 1	1.1	- .93
	G	800	640	32			
10	B	853	700	32	- 3	1.2	-2.54
	G	848	699	35			
13	B	600	756	38	-10	1.7	-5.91
	G	677	780	43			

Computation of differences and their standard errors by present writers.

cant differences in this direction. Woodbury's data on weight for the 167,000 preschool children referred to above yield a mean ratio of male to female variability which differs from unity by eight times its standard error, the ratio being in the direction of greater male variability. For reasons previously stated little confidence can be placed in his findings.

Hollingsworth and Montague (37) have published

TABLE 5
WEIGHT (IN POUNDS) FOR CERTAIN AGE LEVELS IN THREE
CITIES: DATA FROM BOAS AND WISSLER

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
<i>Milwaukee Results</i>							
5	B	301	41.3	4.2	0	.25	0
	G	251	40.0	4.2			
7	B	632	48.9	5.1	.1	.20	.49
	G	597	47.1	5.0			
10	B	545	65.0	8.4	.4	.35	1.13
	G	541	62.6	8.0			
13	B	365	84.5	11.9	—2.8	.72	—3.89
	G	333	87.6	14.7			
<i>Worcester Results</i>							
7	B	202	49.7	5.9	— .2	.48	— .41
	G	128	47.9	6.1			
10	B	221	65.8	8.5	—2.0	.70	—2.86
	G	170	64.1	10.5			
13	B	214	86.9	15.7	.4	1.10	.36
	G	183	89.7	15.3			
<i>Toronto Results</i>							
7	B	930	48.7	5.3	— .1	.18	— .55
	G	844	47.0	5.4			
10	B	878	64.0	7.5	— .6	.26	—2.30
	G	892	61.6	8.1			
13	B	629	82.4	11.6	—1.9	.49	—3.86
	G	671	85.9	13.5			

Computation of differences and their standard errors by present writers.

the results of a series of measurements of 2000 new-born infants. Their investigation was made for the purpose of determining the amount and direction of inherent sex differences in variability, which explains their use of new-born subjects. From the distributions which the authors give we have computed the standard deviations. One finds in Table 8 no sex difference in variation, except perhaps for sub-occipito bregmatic

TABLE 6
WEIGHT (IN POUNDS) OF GLASGOW SCHOOL CHILDREN: DATA
FROM ELDERTON

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
5.5-6.5	M	3322	41.82	4.853	.154	.083	1.85
	F	3104	40.60	4.699			
6.5-7.5	M	3901	45.29	5.329	.100	.084	1.19
	F	3828	43.94	5.229			
7.5-8.5	M	4200	49.32	5.889	.072	.091	.79
	F	3926	47.50	5.817			
8.5-9.5	M	4009	53.66	6.452	— .145	.104	—1.39
	F	3817	51.84	6.597			
9.5-10.5	M	3880	58.38	7.052	— .270	.116	—2.33
	F	3762	56.03	7.322			
10.5-11.5	M	3759	63.05	7.701	— .598	.132	—4.53
	F	3518	61.07	8.299			
11.5-12.5	M	3632	68.04	8.797	—1.410	.157	—8.98
	F	3656	67.15	10.207			
12.5-13.5	M	3638	73.61	10.327	—1.771	.193	—9.17
	F	3224	74.80	12.098			
13.5-14.5	M	1467	79.21	12.385	—1.362	.359	—3.79
	F	1229	82.79	13.747			

All computations by present writers.

circumference. Hollingworth and Montague conclude from their data that there is no inherent sex difference in variation in physical traits. It may be pointed out, however, that there might be an inherent difference in the maturation mechanism whereby one sex could later become more variable than the other. It will be noticed from their data that in length girls and boys are practically equal at birth, but it would seem rather daring to argue from this that there is no inherent difference between the sexes in stature.

The data of Pearson (49) on 2000 new-born infants

TABLE 7
WEIGHT (IN KILOGRAMS) OF BAREY (ENGLAND) SCHOOL CHILDREN: DATA FROM HABAKKUK

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
3.5	B	145	15.18	1.587	— .196	.145	—1.35
	G	131	14.89	1.783			
4.5	B	664	16.09	1.605	.023	.070	.33
	G	600	15.89	1.582			
5.5	B	282	17.47	2.036	— .023	.119	— .19
	G	346	17.06	2.059			
6.5	B	363	19.89	2.212	— .095	.122	— .78
	G	324	19.20	2.307			
7.5	B	467	20.57	2.287	.113	.108	1.04
	G	388	20.10	2.174			
8.5	B	861	23.24	2.716	.013	.093	.14
	G	820	22.62	2.703			
9.5	B	692	25.44	2.865	— .260	.115	—2.26
	G	669	24.82	3.125			
10.5	B	324	27.19	3.362	.012	.185	.06
	G	333	26.13	3.350			
12.5	B	2021	32.72	4.129	—1.215	.109	—11.16
	G	1893	33.30	5.344			

Computation of differences and their standard errors by present writers.

are given in Table 9. In this case both height and weight show a statistically significant difference in favor of greater male variability, a finding which is entirely at odds with that of Hollingworth and Montague.

We have not found reliable anthropometric data on large unselected samples of the adult population of both sexes. The data of Pearson and Lee (50) on brothers and sisters, in Table 10, indicate a slightly though not conclusively greater variation on the part of the male for stature, span of arms, and length of forearm. In this case the selective factors may be

TABLE 8
MEASUREMENTS OF 1000 OF EACH SEX AT BIRTH: DATA FROM
HOLLINGWORTH AND MONTAGUE

Trait	Sex	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
Weight in grams	M	3375.65	491.94	8.39	15.45	.54
	F	3221.17	483.55			
Length in cm.	M	50.51	2.996	-.008	.095	-.08
	F	49.90	3.004			
Circum. of shoulder in cm.	M	34.14	2.534	.100	.079	1.26
	F	33.82	2.434			
Bi-temporal in cm.	M	7.56	.899	-.012	.028	-.43
	F	7.47	.911			
Occipito-frontal diam. in cm.	M	11.36	.746	-.031	.024	-1.29
	F	11.18	.777			
Bi-parietal in cm.	M	8.89	.673	-.003	.021	-.14
	F	8.78	.681			
Occipito-mental in cm.	M	12.99	1.112	.033	.035	.94
	F	12.77	1.079			
Sub-occipito diam. in cm.	M	9.62	.791	-.048	.026	-1.85
	F	9.51	.839			
Occipito-frontal circum. in cm.	M	34.14	1.655	.106	.051	2.08
	F	33.57	1.549			
Sub-occipito bregmatic circum. in cm.	M	31.39	1.614	.160	.049	3.26
	F	30.87	1.454			

All computations except those of means by present writers.

regarded as equivalent for the two sexes. Tables 11 and 12 give data on head measurements and cephalic indices. The Galton Laboratory data summarized in Table 11 were secured from subjects ranging from four to 80 years for males and three to 76 years for females, but have been corrected for age by Harmon (32) and Musselman (45) so as to reduce all subjects, in effect,

TABLE 9
PEARSON'S DATA ON WEIGHT AND LENGTH OF 1000 NEW-BORN
INFANTS OF EACH SEX

	Sex	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Weight in kilograms	M	3.312	.519	.063	.016	3.94
	F	3.208	.456			
Length in cm.	M	52.08	3.38	.39	.105	3.71
	F	51.11	2.99			

Computation of differences and their standard errors by present writers.

TABLE 10
BROTHER AND SISTER COMPARISON IN STATURE, SPAN AND FORE
ARMS: DATA FROM PEARSON AND LEE

		N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Stature cm.	Brother	1164	68.65	2.71	.10	.062	1.61
	Sister	1456	63.87	2.61			
Span cm.	Brother	1164	69.94	3.11	.17	.071	2.39
	Sister	1456	63.40	2.94			
Fore arm cm.	Brother	1164	18.52	.98	.07	.023	3.04
	Sister	1456	16.75	.91			

Computation of differences and their standard errors by present writers.

TABLE 11
FRANCIS GALTON LABORATORY HEAD MEASUREMENTS: DATA
FROM HARMON AND MUSSELMAN, WITH CORRECTION
FOR AGE

	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Head breadth in mm.	M	5615	153.81	5.460	.793	.092	8.61
	F	1852	146.19	4.667			
Head length in mm.	M	4721	195.56	6.261	.338	.120	2.82
	F	1693	184.97	5.923			
Cephalic index	M	4721	78.35	2.975	—.061	.060	—1.02
	F	1693	79.03	3.036			

Computation of differences and their standard errors by present writers.

TABLE 12
CEPHALIC INDICES: DATA FROM PEARSON AND TIPPITT

	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
100 x breadth/ length	B	2313	78.87	3.209	— .675	.075	—9.00
	G	2189	78.37	2.884			
100 x height/ length	B	2313	69.44	3.779	— .099	.081	—1.22
	G	2189	69.21	3.878			

Computation of differences and their standard errors by present writers.

to the same age—40.5 years. A highly significant difference occurs in case of head breadth in favor of greater male variability. The result for breadth/length index in Table 12 would be regarded as indicating a true difference but for the fact that the same trait shows only a small sex difference in Table 11.

The report of Alvarez (1) on systolic blood pressure for 15,000 University of California freshmen indicates a significant difference both absolutely and relatively in favor of greater male variability for the separate age groups as well as the total group. However, the work of Faber and James (23) on school children from three to 17 years of age fails to show consistent sex differences in systolic pressure. Diastolic pressure, pulse pressure, and pulse rate also show no consistent variability differences for these children.

The material we have reviewed is representative of the situation in regard to sex differences in variation in physical traits. So great are the inconsistencies that only one conclusion can be drawn, namely, that there is no proof of the existence of a sex difference except, perhaps, at ages 10 to 14. Since the data are mostly

based on school populations, however, we cannot infer that if we had unselected adult samples no differences would be found. Readers will probably differ in regard to the bearing of this conclusion on the question of variational tendency in mental traits. It seems to us

∴ not to base any inference in regard to mental traits upon physical data.

IV

PSYCHOLOGICAL DATA

Turning now to the data on psychological measurements, we find more investigations to report but much smaller samples than in the case of the anthropometric data. The selective factors involved are in general such as are found when dealing with any public school population. It is probable that selective factors sometimes enter which are differential for sex. This would be the case, for example, if there were a tendency for more boys or more girls of a particular mental level to drop out of school or to attend private schools. Another source of error when we are dealing with the results of mental tests lies in the difficulty of making sure that the measures are really equivalent for the sexes.

In Table 13 are found Thorndike's (66, 67) results of his CAVD¹ intelligence tests of school children of ages 13 to 17 attending certain grades. Twelve of the 13 ratios in this table are in the direction of greater male variability, but the sex differences are not striking except perhaps for age 15, where the ratios, though small, are consistent for the three groups.

The data of Whitmire (72) are based on National Intelligence Test scores of all the public school pupils of the given age levels in a small city (Vallejo, California) and are therefore about as nearly unselected

¹The CAVD test is of the verbal type and correlates highly with the Stanford-Binet. The letters CAVD stand for completion, arithmetic, vocabulary, and directions.

TABLE 13
THORNDIKE'S CAVD DATA FOR CHILDREN IN GRADES 8, 9, AND 10
CLASSIFIED ACCORDING TO AGE

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
June 1924, City 2							
13	B	252	176	44.20	2.95	2.94	1.00
	G	279	177	41.25			
14	B	555	170	46.74	2.40	1.87	1.28
	G	637	168	44.34			
15	B	439	165	46.13	4.20	2.05	2.04
	G	490	167	41.93			
16	B	170	162	45.27	1.02	3.51	.29
	G	155	157	44.25			
June 1922, City 2							
14	B	220	199	42.74	.67	2.71	.24
	G	274	187	42.07			
15	B	377	198	48.59	3.66	2.27	1.61
	G	494	192	44.93			
16	B	373	199	46.89	2.83	2.31	1.22
	G	405	189	44.06			
17	B	153	196	44.53	1.13	3.38	.33
	G	189	180	43.40			
June 1922, City 1							
13	B	180	198	42.59	1.54	3.04	.50
	G	198	190	41.05			
14	B	615	189	44.84	1.15	1.72	.66
	G	716	184	43.69			
15	B	775	189	45.41	1.75	1.49	1.17
	G	1054	184	43.66			
16	B	728	191	46.01	— .77	1.99	— .38
	G	865	187	46.78			
17	B	385	187	46.83	.42	2.30	.18
	G	436	173	46.41			

All computations except those of means by present writers.

as it is possible to secure. Her results, which are given in Table 14, are not suggestive of a sex difference in variability.

The intelligence test results of Pressey (54) reported

TABLE 14
WHITMIRE'S DATA ON NATIONAL INTELLIGENCE TESTS OF UNSE-
LECTED CHILDREN IN VALLEJO, CALIFORNIA

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
8	B	92	62.7	52.0	.8	5.55	.14
	G	79	76.3	51.2			
9	B	95	107.8	55.1	2.3	5.40	.43
	G	102	120.0	52.8			
10	B	95	148.5	52.0	7.2	4.99	1.44
	G	77	158.1	44.8			
11	B	98	171.9	51.0	— 3.0	6.50	— .46
	G	88	190.0	54.0			
12	B	89	208.8	50.5	— 3.5	5.33	— .66
	G	98	216.0	54.0			
13	B	89	221.6	59.0	12.4	7.11	1.74
	G	67	244.4	46.6			

Computation of differences and their standard errors by present writers.

TABLE 15
PRESSEY'S INTELLIGENCE TEST RESULTS WITH UNSELECTED
SCHOOL CHILDREN

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
8	B	57	58.20	23.55	4.74	2.60	1.82
	G	92	64.72	18.81			
9	B	132	70.72	26.74	3.38	2.12	1.59
	G	153	74.04	23.36			
10	B	176	79.12	30.33	4.89	2.10	2.32
	G	177	85.86	25.44			
11	B	179	94.90	32.93	5.05	2.31	2.17
	G	165	100.32	27.88			
12	B	182	106.34	29.73	3.86	2.07	1.86
	G	180	110.97	25.87			
13	B	174	116.60	29.52	5.62	2.03	2.76
	G	174	124.11	23.90			
14	B	138	121.88	32.12	10.08	2.23	4.51
	G	163	131.02	22.04			
15	B	102	131.07	25.32	6.09	2.11	2.88
	G	139	139.51	19.23			

All computations except means by present writers.

in Table 15 show consistently greater male variability. These data are of particular interest in that the girls have a better mean performance at every age, yet have a smaller standard deviation. According to the assumption underlying the use of a measure of relative variation, rather than a measure of absolute variation, one would expect the boys to have the smaller dispersion in view of the fact that their mean scores are lower than those of the girls. Both in their consistency and in amount of variational difference which they show, the data of Pressey are exceptional. The group test used was of the verbal type, consisting of 10 subtests, and was applied to all children of grades three to nine in three small cities in Indiana.

The results of Pintner (53) obtained by the use of his non-language group test are, as shown in Table 16,

TABLE 16
RESULTS FROM A NON-LANGUAGE GROUP TESTS DATA FROM
PINTNER

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
10	M	469	254	90	—8	4.4	—1.83
	F	455	257	98			
12	M	609	322	95	—3	3.7	— .80
	F	737	319	98			

Computation of differences and their standard errors by present writers.

slightly but not significantly in the other direction. Although Pintner reports data for only two ages, his samples are large.

In Table 17 will be found means and standard deviations for Stanford-Binet tests of 2969 kindergarten and

TABLE 17
STANFORD-BINET IQ'S OF UNSELECTED KINDERGARTEN AND FIRST-
GRADE CHILDREN IN BERKELEY, CALIFORNIA:
DATA FROM DICKSON

Group	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
Kinder- garten	B	434	100.04	15.51	1.05	.74	1.40
	G	392	103.49	14.46			
First grade	B	1118	103.46	15.08	.20	.46	.43
	G	1025	104.51	14.88			
Age 5 years	B	543	109.96	14.89	1.06	.63	1.68
	G	504	103.21	13.83			
Age 6 years	B	795	104.30	13.93	— .36	.50	— .72
	G	779	105.16	14.29			
Age 7 years	B	177	96.92	14.35	.79	1.19	.66
	G	110	94.32	13.56			

All computations by present writers.

first-grade school children grouped first according to grade and then according to age. (Children under five and children eight or over are not presented as age groups because of the small numbers.) The slight difference in favor of greater male variability is too small to be statistically significant despite the large size of the sample. The tests were made by trained examiners and were applied impartially to all children entering the public schools of Berkeley, California. We are greatly indebted to Dr. Virgil E. Dickson for this valuable contribution of data.

In addition to the above investigations which we have summarized in tabular form, there are several of more or less value which need not be treated in detail. Whipple (71) has presented data on the National Intelligence Test for 1071 boys and 1127 girls 11 years old. These groups included all the pupils of age 11 in

the public schools of Flint and Jackson, Michigan, 708 from Kansas City, Missouri, and 234 from Lafayette, Indiana. The sex differences between the 10-90 and the 20-80 interpercentile ranges show a slightly greater male variability, in each case the difference being less than once its standard error. The data of Book and Meadows (8) on the intelligence of 5925 high school seniors (State-wide survey in Indiana) show exactly the same quartile range and practically the same 10 to 90 interpercentile range. Binet tests of 2000 children reported by Goddard (30) do not indicate a significant sex difference, though it should be noted that the results were secured by the use of the original 1908 Binet scale and the tests were not administered over a wide enough range to give very typical distributions. Terman (61) failed to find the alleged wider variation of boys in the 1000 subjects on whom the Stanford-Binet scale was standardized. Neterer (46) and Madsen (42), also using the Stanford-Binet, find sex differences which are statistically not significant, in each case the difference being less than once its standard error. Neterer's sample, 160 fourth-grade children of each sex, shows a slightly greater female variability; that of Madsen, consisting of 450 boys and 430 girls in the first and second grades, gave a small difference in favor of greater male variability. Kaulfers (38) reports data on the intelligence of 1000 students of foreign languages in which he finds a sex difference less than once its standard error in favor of the greater male variability. Using the Army Alpha with small age groups, Frasier (26) found no significant differences.

The study of Conrad and Jones (16), based on the Army Alpha scores of 581 males and 607 females distributed over ages 10 to 59, shows greater male variability for 14 of the 18 age groupings. No one difference taken alone would be considered significant. Using the Otis test on about 200 subjects of each sex, ages nine to 14, Armstrong (2) found the boys slightly more variable, the difference being about once its standard error. Broom's (9) investigation of sex difference in mental ability of junior high school pupils, 600 of each sex, shows a difference once its standard error in favor of greater female variation. This result is based on the Terman Group Test. Heilman (33) gives data on 431 girls and 397 boys, age 10, for the Stanford-Binet. The standard deviation for the mental ages of the boys was slightly larger than that for the girls (difference, .95, with a standard error of .74).

By far the most extensive data come from the recent survey of the intelligence of Scottish children (58). All the children in Scotland (except the blind and deaf) between the ages of $10\frac{1}{2}$ and $11\frac{1}{2}$ were tested on a verbal group test (consisting of following directions, opposites, classification, analogies, reasoning, proverbs, etc.) and a pictorial classification test. In all there were 44,210 boys and 43,288 girls, and a carefully drawn sub-sample of 500 of each sex was tested on the Stanford-Binet. The intercorrelations based on the subsample were as follows: verbal group test vs. Binet—boys, .80, girls, .76; verbal vs. pictorial—boys, .54, girls, .51; and pictorial vs. Binet—boys, .49, girls, .41. For the main sample, the difference in variation

on the verbal test was 12 times its standard error, thus giving rather conclusive evidence for greater male variability on this particular test at the age studied. For the pictorial classification test the difference was in the same direction and four times its standard error, and for the sub-sample of 500 of each sex the Stanford-Binet results show a difference in the same direction, but only 1.6 times its standard error.

We may now turn to a group of psychological and

TABLE 18
RATIOS OF THE DIFFERENCE BETWEEN STANDARD DEVIATIONS
DIVIDED BY THE STANDARD ERROR OF THE DIFFERENCE IN
THE TEST DATA OF BURT FOR ABOUT 250 OF
EACH SEX AT EACH AGE

Test	Age					
	7	8	9	10	11	12
Vocabulary	-2.86	-3.23	.87	.80	2.10	3.46
Discontinuous reading-speed	-1.43	-2.88	5.18	1.79	.94	3.33
Prose reading-comprehension		-5.21	-6.76	-2.09	3.22	.51
Prose reading-speed		2.92	2.12	-1.76	-3.58	.70
Prose reading-accuracy		3.34	-3.11	1.06	-3.37	2.63
Spelling	-.24	3.44	1.45	-.78	2.67	2.46
Dictation	1.31	1.89	-1.06	2.00	2.28	-3.37
Arithmetic—oral	1.41	-1.01	-.67	-1.37	1.95	-.32
Arithmetic—mechanical	1.20	.92	.63	1.42	-1.06	2.48
Arithmetic—problems	-.79	1.29	.29	-3.98	-1.94	-2.42
Arithmetic—addition	-2.85	-6.55	3.92	2.39	.65	2.26
Arithmetic—subtraction	-6.72	-.42	-1.91	.95	3.34	-2.22
Arithmetic—multiplication	-2.04	-5.18	-1.80	5.14	2.67	-4.94
Arithmetic—division	-1.71	2.56	2.10	2.60	.55	-1.48
Writing—quality	-4.91	1.66	.00	1.26	3.17	1.36
Writing—speed	-2.48	2.85	1.07	.53	1.42	-4.08
Drawing—quality	3.84	3.17	1.36	1.17	-1.36	-1.17
Handwork—quality	.00	1.49	-1.26	-2.10	2.24	-2.24
Handwork—speed	-1.29	-2.35	-.55	-1.55	1.85	-4.47
Composition—speed	-1.85	-1.67	-2.41	-1.81	-3.35	-3.30
Composition—quality	-1.26	-3.17	-4.10	-3.26	-1.17	-1.98
Composition—length of sentences	-5.60	-1.26	-3.00	6.20	.90	.81

Computation of differences, their standard errors, and ratios by present writers.

educational investigations not based upon the ordinary intelligence test batteries. Table 18 gives the data of Burt (11) on 22 mental-achievement tests of about 250 children of each sex at each age from seven to 12. As in previous tables, a minus sign denotes greater female variability. Although certain of the ratios in Table 18 might, if considered separately, be taken as indicating conclusive differences, now in one direction and now in the other, the table as a whole is too inconsistent to warrant any conclusion. The data of Snoddy and Hyde (59), Table 19, would suggest a difference

TABLE 19
TESTS OF 2321 TEN-YEAR-OLD CHILDREN IN UTAH: DATA FROM
SNODDY AND HYDE

	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Block counting test	M	1161	13.12	4.80	.72	.13	5.50
	F	1160	10.68	4.08			
Comparing numbers	M	1161	24.42	8.15	.55	.25	2.22
	F	1160	27.72	8.70			

Computation of differences and their standard errors by present writers.

for 10-year-olds on the block counting test, but Pyle's (56) data on learning to sort cards (Table 20) run in the opposite direction from those of Snoddy and Hyde at age 10 and reverse themselves in the upper ages. Table 21 gives the Galton Laboratory results for reaction time reported by Harmon (32) and Musselman (45). The measurements presented in Table 21 are from the Galton Laboratory and were doubtlessly carefully made. They have been corrected for age as in Table 11.

TABLE 20
 PYLE'S DATA ON LEARNING CAPACITY AS MEASURED BY CARD
 SORTING

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
8	B	47	92.3	32.4	3.7	4.17	.91
	G	66	104.4	28.7			
9	B	120	108.0	32.4	— 1.4	2.91	— .48
	G	139	123.4	33.8			
10	B	130	124.3	28.1	— 5.4	2.55	—2.12
	G	162	148.9	33.5			
11	B	142	136.1	28.3	— 8.1	2.54	—3.18
	G	182	158.2	36.4			
12	B	162	148.2	33.8	— 4.0	2.69	—1.48
	G	191	164.3	37.8			
13	B	172	166.1	36.7	.1	2.78	.04
	G	175	177.7	36.6			
14	B	184	169.8	34.3	— 3.7	2.65	—1.39
	G	188	189.0	38.0			
15	B	143	177.6	38.0	2.7	2.92	.92
	G	178	192.9	35.3			
16	B	121	191.8	49.1	15.5	3.71	4.18
	G	148	196.5	33.6			
17	B	72	196.6	40.1	5.7	3.98	1.43
	G	127	201.2	34.4			

Computation of differences and their standard errors by present writers.

TABLE 21
 FRANCIS GALTON LABORATORY REACTION TIME MEASUREMENTS:
 DATA FROM HARMON AND MUSSELMAN, WITH
 CORRECTION FOR AGE

	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Reaction time to sound	M	5564	15.58	2.984	— .210	.060	—3.59
	F	1834	15.82	3.194			
Reaction time to sight	M	5563	18.77	3.570	— .110	.070	—1.57
	F	1835	19.35	3.680			

Computation of differences and their standard errors by present writers.

Bickersteth (4) tested about 50 children of each sex for ages 10, 11, 12, and 13 in the elementary schools of Leeds and Yorkshire Dales, using eight tests designed to test ability in crossing out letters and numbers, memory for narrative, and reasoning as measured by solving analogies. The 32 comparisons of mean deviations show the boys were more variable in 18 and the girls in 12. In two cases there was no sex difference. No age progression is noticeable.

The investigation of Dewey, Child, and Ruml (18) on Jewish children in New York, 50 of each sex at each age from nine to 13, yields inconsistent results for mental and manual tests: cart construction, narrative pictures, identification of forms, instruction box, needle threading, nail driving, picture completion, memory for objects, Knox cubes, card sorting, cancellation, substitution, memory for digits, steadiness, strength of grip, the Binet-Simon scale, and the Yerkes-Bridges point scale. If we avoid obvious duplication of measurement, 87 sex comparisons are possible from this study, and of these, 39 show greater male variation, 47 greater female variation, and one no difference.

Pyle (55), using 12 mental tests with about 50 cases of each sex at each age from eight to 18, found that 73 times the average deviation was greater for the girls, 63 times for the boys, and eight times equal. His tests included logical memory, rote memory, substitution, word building, free association, opposites, genus-species, part-whole, and cancellation. The variability of the boys tended to increase with age, that of the girls to decrease.

Various kinds of memory tests were given by Mulhall (44) to 638 children distributed over grades four to eight (population per sex per age not given). Of 58 comparisons, 27 showed greater variation for the girls and 31 for the boys.

The data of Gilbert (29) on muscle sense, sensitive-ness to color differences, suggestibility, motor ability, fatigue, weight, height, reaction time, discrimination time, and memory time show the mean variation to be greater 53 times for the boys, 59 times for the girls, and eight times equal. His subjects were New Haven school children, ranging in age from six to 17, about 50 per sex per age.

Woolley concluded as follows from her extensive data on the mental and physical traits of school and working children: "No consistent sex difference in variability can be shown, either in physical or in mental tests. . . . Boys are more variable than girls in physical capacities during years fourteen to seventeen. . . . As they both reach maturity, variability tended to be the same for both on both types of tests" (75, p. 514).

The reasoning ability of 388 boys and 382 girls distributed over ages nine to 14 has been tested by Bonser (7). The combined results from tests on mathematical judgment, controlled association, selective judgment, and literary interpretation yielded greater variability nine times for the boys and five times for the girls.

Garrett, Bryan, and Perl (28) report the results of testing over 100 of each sex at each of three age levels, 9, 12, and 15, on six memory and four non-memory

tests. Of the 30 possible comparisons, the boys showed greater variability 20 times, but only one difference exceeded three times its standard error (3.37 for logical prose, age 12). Schiller's (57) study of the verbal, numerical, and spatial abilities of third- and fourth-grade children, 160 to 200 of each sex, based on 12 tests, yields no significant sex difference in variation. The boys, however, were slightly more variable on 10 of the 12 tests. Perl's (52) data on four learning tests, 200 boys and 200 girls, fifth and sixth grades, indicate the absence of a difference in variation. Bryan (10) has administered 11 memory tests and the Stanford-Binet to 100 of each sex, ages five to six, and we find from her data that the girls are more variable on six of the tests, though none of the differences is statistically significant. The work of Carroll (12), based on 100 of each sex for each of seven grade groups, indicates a consistent, though not always significant, greater female variation for scores on a prose appreciation test.

The results so far presented have been based for the most part upon unselected, or presumably unselected, school children. The recent introduction of aptitude tests in colleges and universities has afforded data upon many groups. Unfortunately, these groups have admittedly been affected by differential selection as regards sex. In the absence of similar data on unselected groups we have given in Tables 22, 23, and 24 typical results obtained with college freshmen. It will be noted that in all cases the size of samples is large. It should also be stated that the data of each of these three tables

SEX DIFFERENCES IN VARIATIONAL TENDENCY

TABLE 22
TESTS OF COLLEGE FRESHMEN BY THE COUNCIL OF EDUCATION
PSYCHOLOGICAL EXAMINATION, 1931 EDITION.
18,300 Boys; 13,700 Girls

	Sex	Mdn.	Quartile deviation	Diff.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Completion	M	29.16	9.38	.32	.12	2.67
	F	27.58	9.06			
Artificial language	M	27.07	9.33	-2.81	.14	-20.07
	F	37.53	12.14			
Analogies	M	29.33	9.62	.28	.12	2.33
	F	29.00	9.34			
Arithmetic	M	25.21	10.02	2.30	.12	19.17
	F	16.21	7.72			
Opposites	M	33.12	15.44	- .12	.20	- .60
	F	34.47	15.56			
Total score	M	145.13	41.66	1.45	.52	2.79
	F	145.68	40.21			

Computation of differences and their standard errors by present writers.

TABLE 23
PSYCHOLOGICAL TESTS OF COLLEGE FRESHMEN BY COLLEGE EN-
TRANCE EXAMINATION BOARD

Year	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
1926—Total score	M	4800	493.9	106.4	19.2	1.54	12.5
	F	3192	512.7	87.2			
1927—Total score	M	4311	499.4	103.3	15.7	1.58	10.0
	F	3030	498.7	87.6			
1928—Total score	M	4354	490.9	102.8	6.8	1.65	4.1
	F	3061	508.1	96.0			
1929—Total score	M	4084	488.4	103.2	10.5	1.61	6.5
	F	3322	512.5	92.7			
1930—Total verbal	M	4394	487.0	102.9	8.6	1.60	5.4
	F	3318	517.5	94.3			
1930—Total math.	M	4394	510.2	105.1	15.2	1.57	9.7
	F	3318	484.4	89.9			
1931—Total verbal	M	4214	484.6	104.0	11.0	1.60	6.9
	F	3362	512.3	93.0			
1931—Total math.	M	4214	511.1	103.4	10.9	1.58	6.9
	F	3362	476.7	92.5			

Computation of differences and their standard errors by present writers.

TABLE 24
TESTS OF CALIFORNIA JUNIOR COLLEGE FRESHMEN, BASED ON
AMERICAN COUNCIL OF EDUCATION, AND IOWA
CONTENT EXAMINATIONS

Test	Sex	N	M	S.D.	Diff.		
					S.D.	$\sigma_{diff.}$	$\sigma_{diff.}$
American Council:							
Arithmetic	M	3236	29.6	12.5	1.3	.22	5.9
	F	2632	21.9	11.2			
Artificial language	M	3236	22.8	11.0	-1.9	.23	-8.3
	F	2632	29.5	12.9			
Iowa Content:							
English	M	3453	49.9	18.1	— .3	.32	— .9
	F	2880	55.3	18.4			
Mathematics	M	3453	34.7	14.9	2.6	.24	10.8
	F	2880	25.2	12.3			
Science	M	3453	47.7	14.4	3.5	.22	15.9
	F	2880	35.6	10.9			
History	M	3243	57.7	15.5	1.0	.28	3.6
	F	2675	52.2	14.5			

Computation of differences and their standard errors by present writers.

have come from a number of institutions, public and private, coeducational and non-coeducational. The samples may accordingly be regarded as reasonably representative of the general college population of the United States.

Table 22 gives data on the Council of Education Psychological Examination, 1931 edition (68). Here the artificial language test shows a highly significant difference in favor of greater female variability, whereas a difference of equal magnitude in favor of the males is found for the arithmetic test. The differences for the other subtests and the total score are of doubtful significance.

The data reported by the College Entrance Exam-

ination Board (14), given in Table 23, would indicate consistent and large differences in favor of greater male variability. Of 39 possible comparisons for subtests, all but three are in agreement with the total score as regards direction. Data on California junior college freshmen by Eells (19) are summarized in Table 24. It will be noticed that the large difference on the artificial language test is consistent with the difference for the same test in Table 22.

Colvin (15) gave the Brown University Psychological Examination to seniors, 1262 boys and 2071 girls, in 34 Massachusetts high schools, finding a difference between the standard deviations which was once its standard error in favor of greater male variation.

At Ohio State University, the Army Alpha was administered in 1921 to the entire student body, 4438 men and 1512 women. From the report (47) we find a difference between standard deviations which is 2.24 times its standard error, and again in favor of the males.

Data furnished by the Registrar's Office at Stanford University, where women are more highly selected than men, show that the mean performance of the women on the Thorndike Examination is, as would be expected, somewhat higher than that of men; nevertheless the proportion scoring at the higher levels is much greater for the males. For example, the proportion of men scoring beyond the 100th percentile for women is five times its standard error. This is based on a population of 2791 men and 476 women, or all the students registered at Stanford for the year 1927-28. (The use

of the standard deviation is meaningless here because of selection operating to curtail the lower end of the female distribution.)

The above results clearly indicate greater male variability among American college students, but it is impossible to say that selective factors have not been largely responsible. The fact that so few women are found among the highest scoring college students suggests that the intellectual development of men, or at least of gifted men, may continue to a later age than that of women who showed similar ability at the earlier age levels. A bit of evidence in this direction comes from Terman's (63) follow-up study of gifted children in which it was found that after a period of six years the

TABLE 25
SEASHORE MUSIC TESTS OF 100 FIFTH-GRADE CHILDREN OF EACH
SEX: DATA FROM FARNSWORTH

	Sex	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
Pitch	B	63.5	15.8	2.0	1.49	1.34
	G	65.1	13.8			
Intensity	B	73.7	11.5	.1	1.15	.09
	G	70.7	11.4			
Time	B	61.2	10.3	1.8	.95	1.89
	G	60.0	8.5			
Consonance	B	59.4	9.4	— .6	.97	— .62
	G	62.4	10.0			
Tonal memory	B	43.2	16.1	1.5	1.52	.99
	G	46.1	14.2			
Rhythm	B	64.6	10.1	.6	.98	.61
	G	65.4	9.5			
Melody	B	24.1	3.8	0	.38	0
	G	25.0	3.8			
Harmony	B	21.2	4.1	.2	.40	.50
	G	22.2	3.9			

Computation of differences and their standard errors by present writers.

average drop in IQ was three points for the boys and 13 points for the girls, a difference in decrease which is more than three times its standard error.

There are few investigations of special mental abilities which present data on sex differences. Lewerenz (40) reports sex differences on his test of art ability based on 500 children of each sex. The nine subtests show no difference in variability. Total scores are not given. Table 25 presents results found by Farnsworth (24) for the Seashore Music Tests of fifth-grade school children. It will be observed that there is no significant sex difference in variability in the case of any of

TABLE 26
SEASHORE AND KWALWASSER MUSIC TESTS OF EIGHTH-GRADE
CHILDREN, 100 OF EACH SEX: DATA FROM CHURCH

	Sex	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
<i>Seashore Battery Test</i>						
Pitch	B	73.3	12.6	.7	1.22	.57
	G	73.0	11.9			
Intensity	B	81.8	8.3	— 3.0	.99	— 3.03
	G	77.3	11.3			
Time	B	71.9	9.2	.9	.88	1.02
	G	68.8	8.3			
Consonance	B	68.0	7.7	.3	.75	.40
	G	65.5	7.4			
Tonal memory	B	75.5	11.8	— 4.3	1.41	— 3.05
	G	59.7	16.1			
Rhythm	B	64.9	9.0	1.8	.82	2.20
	G	64.5	7.2			
<i>Kwalwasser Battery Test</i>						
Melodic sensitivity	B	26.9	3.2	— .3	.34	.88
	G	26.3	3.5			
Harmonic sensitivity	B	24.4	3.9	.6	.36	1.67
	G	23.8	3.3			

Computation of differences and their standard errors by present writers.

the tests. The data of Church (13), Table 26, are inconsistent in the case of the Seashore tests, and in the case of the Kwalwasser test, show differences too small to be significant.

In a later study Farnsworth (25) tested about 100 of each sex at two grade levels, fifth and eighth, on the Kwalwasser-Dykema music tests. His reported standard deviations not only fail to indicate any significant differences, but also show marked inconsistencies from test to test and from group to group. Farnsworth also reports results on college men and women (N 's greater than 100), and here are found two statistically reliable differences in the direction of greater female variation (quality and intensity tests). These figures, however, are not supported by the data of Manger and Marovitz (43), where differences in the opposite direction for these two tests were found. Their sample was composed of 285 college men and 215 college women.

V

EDUCATIONAL DATA

Little reliable information is available concerning sex differences in variation for educational and achievement tests. Grade distributions are too frequently used in which age as a variable is allowed to run wild, thus tending to invalidate any conclusions on sex differences. The Stanford Achievement Test has been given by Baldwin (3) to eight- nine-, and 10-

TABLE 27
REPEATED TESTS WITH STANFORD ACHIEVEMENT TEST BATTERY:
DATA FROM BALDWIN

Age	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
<i>Tests in 1923</i>							
8	B	100	16.0	6.75	—1.05	.70	—1.50
	G	115	18.3	7.80			
9	B	117	25.1	10.20	.26	.91	.28
	G	126	26.1	9.94			
10	B	96	33.1	11.58	.63	1.18	.53
	G	87	35.0	10.95			
<i>Same groups tested in 1924</i>							
9	B	100	27.4	10.13	— .58	1.01	— .58
	G	115	29.1	10.71			
10	B	117	37.9	11.58	1.10	1.00	1.10
	G	126	38.3	10.48			
11	B	96	44.2	12.88	1.90	1.25	1.52
	G	87	44.2	10.98			
<i>Same groups tested in 1925</i>							
10	B	100	41.0	11.92	1.22	1.10	1.11
	G	115	42.4	10.70			
11	B	117	49.0	12.18	.86	1.07	.80
	G	126	49.1	11.32			
12	B	96	54.4	13.28	.50	1.36	.37
	G	87	54.4	12.78			

Computation of differences and their standard errors by present writers.

year-old children for three successive years. In his results, presented in Table 27, it will be seen that there are no variational differences. Touton (69), using a series of tests designed to measure geometric ability, has published results which are reproduced in Table 28. The lack of consistency from test to test makes it

TABLE 28
TESTS OF GEOMETRIC ABILITIES OF HIGH SCHOOL PUPILS: DATA
FROM TOUTON

Test No.	Sex	N	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	Diff. $\sigma_{diff.}$
5	B	792	10.1	3.6	— .1	.12	— .83
	G	881	9.7	3.7			
6	B	1030	9.4	3.5	— .2	.11	—1.82
	G	1167	9.8	3.7			
7	B	621	10.2	3.2	— .5	.13	—3.85
	G	745	9.4	3.7			
8	B	540	10.7	3.4	— .9	.15	—6.00
	G	703	8.9	4.3			
9	B	1289	5.9	2.6	.3	.07	4.30
	G	1504	4.7	2.3			
10	B	842	9.7	3.0	0	.10	0
	G	934	8.6	3.0			
11	B	924	8.3	3.1	— .4	.11	—3.64
	G	921	7.3	3.5			
12	B	827	11.0	3.0	—1.0	.11	—9.09
	G	1021	10.2	4.0			
13	B	1063	4.3	4.2	1.6	.10	16.00
	G	1485	2.6	2.4			

Computation of differences and their standard errors by present writers.

impossible to say that one sex is more variable than the other in whatever is measured by this test. On his completion-test language scale, Trabue (70) finds no difference in variability between 435 girls and 789 boys in the sixth grade, nor when the subjects were

TABLE 29
STANFORD ACHIEVEMENT TEST SCORES FOR TEN-YEAR-OLDS, 464
BOYS AND 482 GIRLS OF AMERICAN PARENTAGE:
FROM HEILMAN

Test	Sex	M	S.D.	Diff. S.D.	$\sigma_{diff.}$	$\frac{Diff.}{\sigma_{diff.}}$
Reading: para- graph meaning	M	64.07	14.95	-3.65	.77	-4.74
	F	62.24	18.50			
Reading: sen- tence meaning	M	40.81	13.37	.02	.61	.03
	F	39.83	13.35			
Reading: word meaning	M	41.52	11.45	.60	.54	-1.11
	F	41.54	12.05			
Reading: total	M	145.42	36.51	-1.86	1.72	-1.08
	F	142.05	38.37			
Arithmetic: computation	M	94.26	22.18	.93	1.00	.93
	F	91.30	21.25			
Arithmetic: reasoning	M	56.37	17.50	-1.00	.83	-1.20
	F	59.50	18.50			
Arithmetic: total	M	150.95	37.07	.57	1.72	.33
	F	150.45	37.64			
Nature study and science	M	35.91	15.15	.90	.72	-1.25
	F	38.62	16.05			
History and literature	M	22.97	13.30	-4.60	.73	-6.30
	F	26.65	17.90			
Language usage	M	22.82	12.25	0	.56	0
	F	19.95	12.25			
Spelling	M	99.02	27.15	.90	1.27	.71
	F	90.80	28.05			
Composite score	M	47.32	12.39	.81	.59	-1.37
	F	46.48	13.20			

classified by age. He also finds no difference for 448 unselected girls and 801 unselected boys of age 12. The arithmetic test of Stone (60) yielded no consistent sex difference in variation. The only uncurtailed age distribution we can find for the Courtis (17) arithmetic test, one for 2294 boys and 2227 girls at age 11.5 years, gives a difference between standard deviations which

is 3.8 times its standard error in favor of greater female variability. Heilman (33) has recently made a study of sex difference, using the Stanford Achievement Test with 482 girls and 464 boys, all of age 10 and of American parentage. His results are presented in Table 29, from which it will be seen that significant differences in variability (greater for females) occur for the paragraph reading test and for the history and literature test. Woody (74), in a study of the arithmetical background of young children (kindergarten to second grade), finds for about 300, 900, and 500 subjects of each sex for grades 1B and 1A, and for age six, respectively, differences which are 1.39, 2.15, and 2.53 times their standard errors in favor of greater male variation. The test used was an inventory test of 206 situations involving the use of arithmetic.

Another approach to our problem is afforded by studies of school acceleration and retardation. From data which he has collected Keyes (39) claims that more boys are accelerated and also more retarded, but the differences he gives are in reality not statistically significant. In fact, if he had reduced his frequencies to proportions he would have found more girls accelerated than boys (a slight difference only, yet opposite to his conclusion). An extensive study of the grade location of over 62,000 13-year-old children has been made by Frasier (27), from which the author concludes that there is no sex difference in variation in grade location. However, the standard deviations differ by 2.47 times the standard error of the difference in the direction of the males being more variable. For

a more detailed summary of the literature on various school subjects, the reader is referred to the work of Lincoln (41). It is sufficient here to point out that the data assembled by Lincoln cannot be interpreted as indicating any clear or consistent sex difference with respect to variability.

VI

SUMMARY AND CONCLUSIONS

In this paper an attempt has been made to evaluate the methods and logic which have led various investigators and reviewers to draw conclusions concerning sex differences in variation. The literature has been searched in an effort to bring together and render comparable the results of the most important investigations bearing on the psychological aspect of the problem. Either the results have been presented in terms of differences between standard deviations divided by their standard errors, or, in instances where the samples were relatively small or other measures of variation were given, the direction of the differences has been noted.

Perhaps some readers would like one super-statistical figure which would represent a summary of the great mass of differences, more or less significant when considered alone, which have been brought together in this review. The authors are unable to satisfy this natural craving. No meaning can be attached to an average based upon such diverse elements as, for example, height, intelligence, musicality, and art ability; even the pooling of results from related traits cannot be entirely justified. The need for some type of summary, however, would seem to warrant the latter procedure. Perhaps it should be pointed out that if no difference in variation exists, then one would expect the distribution of ratios of differences to their standard errors to center about zero with a standard deviation of unity, and of course where we have only the

direction of the difference given, one would expect approximately as many in one as in the other direction.

A careful consideration of the anthropometric data reveals that for ages up to ten the average of 43 ratios (difference to standard error) is $+.19$, which is not significantly different from zero, but for ages 10 to 14 inclusive, the mean of 38 ratios is -2.47 (greater female variation), a value which differs from zero by 15 times its standard error. For ages 15 and up, the seven ratios have a mean of $+6.64$, which is highly significant in favor of greater male variation. The greater variation for the females at ages 10 to 14 can be explained on the basis of pubertal changes which would not affect the distributions for the males until about ages 14 to 16. It should be noted that the use of the coefficient of variation would not change the results at ages 10 to 14, whereas for the older and adult levels such a measure would tend to reduce the differences between the sexes with regard to variation in physical characteristics. As stated previously, the authors feel that the significance of the anthropometric findings for the more important psychological problem is open to question.

An examination of the results for psychological and educational tests fails to indicate any trends with age, except in so far as greater male variation is revealed for samples of the college population, which cannot be interpreted because of the network of selective factors involved. There appears to be nothing but inconsistencies with regard to differences in variability in edu-

cational achievement, a finding which agrees with the conclusion of Lincoln's earlier review (41).

The meager data for special abilities would seem to indicate the absence of a sex difference in variation with respect to art ability, whereas for music tests administered to grade school children, the males show greater variability 22 times, the females seven times, and seven times the variation is equal. At the college level the respective figures are 10, seven, three. It should be noted that the differences are small, and that none of the samples is based on age groups.

The large amount of data based on more or less non-standardized psychological tests can perhaps best be summarized by a count of the direction of the differences: 320 times greater male variation, 322 times greater female, and 24 times equal. When the results are considered for a classification of the tests into somewhat narrower groupings, verbal, arithmetic, and performance, no consistent trends are discoverable. It would seem safe, therefore, to conclude that on the basis of the available data it cannot be said that there is a sex difference in variation in the functions measured by these varied tests.

When we turn to the evidence given by standardized verbal intelligence test batteries, we find a rather significant trend. Of 33 comparisons based on age groupings, 29 show greater male variation. The mean of the ratios of differences to their standard errors is $+1.47$, which differs from zero by 8.4 times its standard error, and the median value of 1.18 is 5.4 times its standard error. These data, being consistent from battery to

battery and for the several age levels, would seem to be rather conclusive in favor of greater male variation in intelligence as defined by these tests. If one considers the mean ratio of standard deviations for boys to those for girls it will be found that the difference in standard deviations is equivalent to about one point on the IQ scale, that is, if the standard deviation for girls is 16 IQ points, that for the boys would be 17 points. Such a conclusion was reached by the Scottish survey (58), which is based on the largest random sample ever used in a psychological study, and is here supported by results from Thorndike's CAVD, the National Intelligence test, the Pressey group test, and the Stanford-Binet.² If we can assume that intelligence (as measured) is distributed in a Gaussian manner, this difference of one IQ point in variability would mean that in general about nine boys to six girls would score above 140 or below 60 IQ, and that twice as many boys as girls would exceed 160 or fall below 40.³

²Too recently obtained to include in detail in this review are the results from the New Revision of the Stanford-Binet. The standardization group, which includes over 1500 of each sex from age two to 18, is as typical as modern sampling procedures permit. The combined scores for the two forms (equivalent to a test three times as long as the original Stanford Revision) yield insignificant and inconsistent sex differences in variation.

³A school population of 168,000 in grades three to eight, which was sifted (by methods deemed equally fair to both sexes) in search for children of 140 Stanford-Binet IQ or higher, yielded 352 boys and 291 girls who reached or exceeded this standard, a ratio of about 6 to 5. Of these, 65 boys and 48 girls reached or exceeded 160 IQ, a ratio of approximately 5.4 to 4. A large high school population sifted by the use of the Terman Group Test yielded 257 boys and 121 girls whose scores were judged to be the equivalent of a Stanford-Binet IQ of 140 or above (62).

These findings with respect to intelligence are based upon pre-adult samples, and in the absence of data regarding a possible sex difference in mental maturation, one cannot make any inference regarding the general adult population. Nor do the inconsistent results for other psychological tests given at school ages permit one to say that any or all of these traits would not exhibit a difference on the adult level.

REFERENCES

1. ALVAREZ, W. C. Blood pressure in fifteen thousand university freshmen. *Arch. Int. Med.*, 1923, 32, 17-30.
2. ARMSTRONG, C. P. Sex differences in the mental functioning of school children. *J. Appl. Psychol.*, 1932, 16, 559-571.
3. BALDWIN, B. T. The educational growth of elementary school children. *J. Educ. Psychol.*, 1928, 19, 521-535.
4. BICKERSTETH, M. E. The application of mental tests to children of various ages. *Brit. J. Psychol.*, 1917, 9, 23-73.
5. BOAS, F. The growth of Toronto children. *Rep. U. S. Commissioner Educ.*, 1896-97, 2, 1541-1599.
6. BOAS, F., & WISSLER, C. Statistics of growth. *Rep. U. S. Commissioner Educ.*, 1904, 1, 25-132.
7. BONSER, F. G. The reasoning ability of children. *Teach. Coll., Columbia Univ., Contrib. Educ.*, 1910, No. 37. Pp. 133.
8. BOOK, W. F., & MEADOWS, J. L. Sex differences in 5925 high school seniors in ten psychological tests. *J. Appl. Psychol.*, 1928, 12, 56-81.
9. BROOM, E. M. Sex difference in mental ability among junior high school pupils. *J. Appl. Psychol.*, 1930, 14, 83-90.
10. BRYAN, A. I. Organization of memory in young children. *Arch. Psychol.*, 1934, No. 162. Pp. 56.
11. BURT, C. Mental and scholastic tests. London County Council, 1921. Pp. 420.
12. CARROLL, H. A. Influence of sex factor upon appreciation of literature. *School & Soc.*, 1933, 37, 468-472.
13. CHURCH, N. L. A statistical study of the Seashore measures of musical talent and the Kwalwasser tests of melodic and harmonic sensitivity. Master's Thesis, Stanford Univ. Library, 1930.
14. COLLEGE ENTRANCE EXAMINATION BOARD. First six annual reports of the secretary, 1926-1931. New York.
15. COLVIN, S. S., & MACPHAIL, A. H. Intelligence of seniors in the high schools of Massachusetts. *U. S. Bur. Educ.*, 1924. No. 9. Pp. 39.
16. CONRAD, H. S., JONES, H. E., & HSIAO, H. H. Sex difference in mental growth and decline. *J. Educ. Psychol.*, 1933, 24, 161-169.

17. COURTIS, S. A. Report on the Courtis tests in arithmetic. *N. Y. Com. School Inquiry*, 1911, 1, 391-546.
18. DEWEY, E., CHILD, E., & RUMI, B. Methods and results of testing school children. New York: Dutton, 1920. Pp. 176.
19. ELLIS, W. C. The California junior college mental education survey. *Educ. Rec.*, 1930, 11, 281-291.
20. ELDERTON, E. M. Height and weight of school children in Glasgow. *Biom.*, 1915, 10, 288-339.
21. ELLIS, H. Man and woman. 6th ed. London: Scott, 1926. Pp. 563.
22. ———. Variation in man and woman. *Pop. Sci. Mo.*, 1903, 62, 237-253.
23. FADER, H. K., & JAMES, C. A. The range and distribution of blood pressure in normal children. *Amer. J. Dis. Child.*, 1921, 22, 7-28.
24. FARNSWORTH, P. R. Historical, critical and statistical study of the Seashore-Kwalwasser Test Battery. *Genet. Psychol. Monog.*, 1931, 9, 291-393.
25. ———. Studies in the psychology of tone and music. *Genet. Psychol. Monog.*, 1934, 15, 1-94.
26. FRASIER, G. W. A statistical study of sex differences in intelligence. Master's Thesis, Stanford Univ. Library, 1918.
27. ———. A comparative study of the variability of boys and girls. *J. Appl. Psychol.*, 1919, 3, 151-155.
28. GARRETT, H. E., BRYAN, A. I., & PERL, R. E. The age factor in mental organization. *Arch. Psychol.*, 1935, No. 176. Pp. 31.
29. GILBERT, J. A. Researches on physical and mental growth of school children. *Stud. Yale Psychol. Lab.*, 1894, 2, 40-100.
30. GODDARD, H. H. Two thousand normal children measured by the Binet measuring scale of intelligence. *Ped. Sem.*, 1911, 18, 232-259.
31. HABAKKUK, E. G. A statistical study of the physique of elementary school children with special reference to their mentality. *J. Hyg.*, 1926, 25, 295-322.
32. HARMON, G. E. On the degree of relationship between head measurements and reaction time to sight and sound. *Biom.*, 1926, 18, 207-220.

33. HEILMAN, J. D. Sex difference in intellectual abilities. *J. Educ. Psychol.*, 1933, 24, 47-62.
34. HOLLINGWORTH, L. S. The frequency of amentia as related to sex. *Med. Rec.*, 1913, 84, 753-756.
35. ———. Variability as related to sex differences in achievement. *Amer. J. Soc.*, 1914, 19, 510-530.
36. ———. Differential action upon the sexes of forces which tend to segregate the feeble-minded. *J. Abn. & Soc. Psychol.*, 1922, 17, 35-57.
37. HOLLINGWORTH, L. S., & MONTAGUE, H. The comparative variability of the sexes at birth. *Amer. J. Soc.*, 1914, 20, 335-370.
38. KAULFERS, W. Intelligence of 1000 students of foreign languages. *School & Soc.*, 1928, 28, 597-599.
39. KEYES, C. H. Progress through the grades of city schools. *Teach. Coll., Columbia Univ., Contrib. Educ.*, 1911, No. 42. Pp. 79.
40. LEWERENZ, A. S. Sex differences on ability tests in art. *J. Educ. Psychol.*, 1928, 19, 629-635.
41. LINCOLN, E. A. Sex differences in the growth of American school children. Baltimore: Warwick & York, 1927. Pp. 189.
42. MADSEN, I. N. Some results with the Stanford Revision of the Binet-Simon tests. *School & Soc.*, 1924, 19, 559-562.
43. MANGER, C. W., & MAROVITZ, S. Sex differences between the scores of men and women on Kwalwasser-Dykema music tests. *J. Appl. Psychol.*, 1935, 19, 331-347.
44. MULHALL, E. F. Tests of the memories of school children. *J. Educ. Psychol.*, 1917, 8, 295-302.
45. MUSSELMAN, J. R. On the correlation of head measurements and mental agility. *Women. Biom.*, 1926, 18, 195-206.
46. NETERER, I. M. A critical study of certain measures of mental ability and school performance. Baltimore: Warwick & York, 1923. Pp. 142.
47. OHIO STATE. The university intelligence tests. *Ohio State Univ. Bull.*, 1922, 27, No. 5.
48. PEARSON, K. Chances of death. Vol. I. London: Arnold, 1897. Pp. 388.
49. ———. Data on the problem of evolution in man, III. *Proc. Royal Soc., London*, 1900, 66, 23-32.

50. PEARSON, K., & LEE, A. On the laws of inheritance in man. I. Inheritance of physical characters. *Biom.*, 1903, 2, 357-462.
51. PEARSON, K., & TIPPITT, L. H. C. On the stability of the cephalic indices within the race. *Biom.*, 1924, 16, 118-138.
52. PERL, R. E. The effect of practice upon individual differences. *Arch. Psychol.*, 1933, No. 159. Pp. 54.
53. PINTNER, R. Results obtained with the non-language group test. *J. Educ. Psychol.*, 1924, 15, 473-483.
54. PRESSEY, L. W. Sex differences shown by 2544 school children. *J. Appl. Psychol.*, 1918, 2, 323-340.
55. PYLLE, W. H. The examination of school children. New York: Macmillan, 1913. Pp. 70.
56. ———. Sex differences and sex variability in learning capacity. *School & Soc.*, 1924, 19, 352.
57. SCHILLER, B. Verbal, numerical and spatial abilities of young children. *Arch. Psychol.*, 1934, No. 161. Pp. 69.
58. SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION. The intelligence of Scottish children. London: Univ. London Press, 1933. Pp. 155.
59. SNOODY, G. S., & HYDE, G. E. Mental survey of Utah schools. *Bull. Univ. Utah*, 1921, 12, No. 6.
60. STONE, C. W. Arithmetic abilities. *Teach. Coll., Columbia Univ., Contrib. Educ.*, 1908, No. 19. Pp. 101.
61. TERMAN, L. M. The measurement of intelligence. New York: Houghton Mifflin, 1916. Pp. 362.
62. TERMAN, L. M., & OTHERS. Genetic studies of genius. Vol. I. Stanford University: Stanford Univ. Press, 1925. Pp. 648.
63. ———. Genetic studies of genius. Vol. III. Stanford University: Stanford Univ. Press, 1930. Pp. 508.
64. THORNDIKE, E. L. Sex in education. *The Bookman*, 1906, 23, 211-214.
65. ———. Educational psychology. Vol. III. New York: Teach. Coll. Bur. Publ., 1914. Pp. 408.
66. ———. Sex differences in status and gain in intelligence scores from 13 to 18. *Ped. Sem.*, 1926, 33, 167-182.
67. ———. On the variability of boys and girls from 13 to 18. *Ped. Sem.*, 1926, 33, 18; 182-184.

68. THURSTONE, L. L., & THURSTONE, T. G. The 1931 Psychological Examination. *Educ. Rec.*, 1932, 13, 121-136.
69. TOUTON, F. C. Sex differences in geometric abilities. *J. Educ. Psychol.*, 1924, 15, 234-247.
70. TRABUE, M. R. Completion-test language scales. *Teach. Coll., Columbia Univ., Contrib. Educ.*, 1916, No. 77. Pp. 118.
71. WHIPPLE, G. M. Sex differences in intelligence test scores in the elementary school. *J. Educ. Res.*, 1927, 15, 111-117.
72. WHITMIRE, E. D. A study of sex differences in 1340 unselected children. M.A. Thesis, Stanford Univ. Library, 1920.
73. WOODBURY, R. M. Statures and weights of children under six years of age. U. S. Dept. Labor, Children's Bureau, Wash. Govt. Print Off., 1921, No. 187, 1-117.
74. WOODY, C. The arithmetical background of young children. *J. Educ. Res.*, 1931, 24, 188-201.
75. WOOLLEY, H. T. An experimental study of children. New York: Macmillan, 1926. Pp. 762.

ADDITIONAL TITLES BEARING ON THE PSYCHOLOGICAL ASPECT OF
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76. ATKINSON, C. The effect of sex differences in the study of general science. *J. Educ. Res.*, 1931, 24, 61-66.
77. BERLINER, A. Aesthetic judgments of school children. *J. Appl. Psychol.*, 1918, 2, 229-242.
78. BOOK, H. M. A psychophysical analysis of sex differences. *J. Soc. Psychol.*, 1932, 3, 434-462.
79. BROOKS, F. D. Changes in mental traits with age. *Teach. Coll. Contrib. Educ.*, 1921, No. 116. Pp. 86.
80. BROWN, W. Correlation of mental abilities. *Brit. J. Psychol.*, 1910, 3, 296-322.
81. CASTLE, C. S. Statistical study of eminent women. New York: Science Press, 1913. Pp. 90.
82. CATTELL, J. McK. Statistical study of eminent men. *Pop. Sci. Mo.*, 1903, 62, 359-378.
83. COMMINS, W. D. More about sex differences. *School & Soc.*, 1928, 28, 599.
84. CONKLIN, E. S. The determination of normal extravert-introvert interest differences. *Ped. Sem.*, 1927, 34, 28-37.

85. CONRAD, H. S., & JONES, H. E. Psychological studies of motion pictures: V. Adolescent and adult sex differences in immediate and delayed recall. *J. Soc. Psychol.*, 1931, 2, 433-459.
86. FISHER, V. E. A few notes on age and sex differences in mechanical learning. *J. Educ. Psychol.*, 1927, 18, 562-564.
87. FRAILEY, L. E., & CRAIN, C. M. Correlation of excellence in different school subjects. *J. Educ. Psychol.*, 1914, 5, 141-154.
88. GARTH, T. R., IKEDA, K., & LANGDON, R. M. The color preferences of Japanese children. *J. Soc. Psychol.*, 1931, 2, 397-402.
89. HENMON, V. A. C., & LIVINGSTON, W. F. Comparative variability at different ages. *J. Educ. Psychol.*, 1922, 17, 17-29.
90. HOLLINGWORTH, L. S. Comparison of the sexes in mental traits. *Psychol. Bull.*, 1918, 15, 427-432.
91. JAMIESON, E., & SANDIFORD, P. The mental capacities of Southern Ontario Indians. *J. Educ. Psychol.*, 1928, 19, 536-551.
92. JENKINS, L. M. Motor achievements of children five to seven years of age. *Teach. Coll. Contrib. Educ.*, 1930, No. 44. Pp. 54.
93. KUPER, G. Group differences in the interests of children. *J. Phil., Psychol. & Sci. Meth.*, 1912, 9, 377-379.
94. LOUITT, C. M. Racial comparison of ability in immediate recall of logical and nonsense material. *J. Soc. Psychol.*, 1931, 2, 205-215.
95. McCLURE, W. E. Intelligence of 600 juvenile delinquents. *J. Juv. Res.*, 1933, 27, 35-43.
96. McELWEE, E. Further standardization of the Ellis memory for objects test. *J. Appl. Psychol.*, 1933, 27, 68-69.
97. MALLER, J. B. Cooperation and competition. *Teach. Coll. Contrib. Educ.*, 1929, No. 384. Pp. 176.
98. MYERS, G. C. Incidental memory. *Arch. Psychol.*, 1913, No. 26, Pp. 108.
99. PRESSEY, S. L., & L. W. Further data with regard to sex differences. *J. Appl. Psychol.*, 1921, 5, 78-84.
100. ROGERS, A. L., & McINTIRE, J. L. Intelligence of children. *Brit. J. Psychol.*, 1914, 7, 265-299.

101. TAYLOR, C. D. Visual perception and aesthetic perception in judging colored weights. *J. Educ. Psychol.*, 1930, 4, 229-246.
102. THOMPSON, H. B. *The mental traits of man*. Univ. Chicago Press, 1906. Pp. 188.
103. THORNDIKE, E. L. [Ed.] *Hereditary differences in school abilities*. *Educational Commission for Psychol. & Educ.*, 1903, 11, No. 2. Pp. 200.
104. THURSTONE, L. L. Norms for the 1927 psychology examination. *Educ. Rev.*, 1928, 9, 162-168.
105. WINSOR, A. L. The relative variability of tests and groups. *J. Educ. Psychol.*, 1927, 18, 327-346.
106. WOOLLEY, H. T. The psychology of sex. *Psychol. Rev.*, 1914, 11, 353-379.
107. YERKES, R. M., HARDWICK, R. S., & HERRICK, J. W. A point scale for measuring mental ability. *Harvard Univ. Press*, 1915. Pp. 218.

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**Child Behavior, Animal Behavior,
and Comparative Psychology**

THE PROCESS OF LEARNING TO DRESS AMONG NURSERY-SCHOOL CHILDREN*

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Washington, D. C.*

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I

INTRODUCTION

The ability to dress oneself is a skill usually developed during the preschool years. It is a learning process with 0 per cent and 100 per cent learning levels, and with time and error curves which are influenced by the important factors of chronological age, of mental age, of interest, guidance, amount, and difficulty of clothing.

References to this dressing ability found in the literature on child development are for the most part of a general nature. The suggestions therein are based on experience rather than on experimental research, and concern: (*a*) the necessity for simplicity of clothing; (*b*) the value of dressing for self-help; (*c*) the chronological age at which a child may dress himself; and (*d*) the influencing factors of interest, motor control, perception, guidance, intelligence, and individual differences. Simplicity of clothing is considered important for learning to dress, for self-help and health, for ease of laundering clothing, for continued interest, and for safety. Since simplicity of clothing encourages children to dress themselves, recommendations are made for few articles of clothing, slip-on clothes, front openings and fastenings, laces with stiff ends, large eyelets, and large enough buttons; buttons are usually considered the best type of fastening, and clothes should be kept in a state of repair (2, 4, 6, 10, 11). The chronological age at which a child begins to dress himself is placed at two years; however, within the process, there

are skills of varied difficulty (1), so that, for example, between two and two and one-half years there does not seem to be sufficient motor control to manipulate buttons (2); at two and one-half years lacing can be begun with guidance, and stockings and trousers can be slipped on when properly laid out (10). Of the influencing factors, interest is found to develop with ability (2). At two and one-half there is increased mastery of dressing with more enjoyment and less strain (10). Interest in buttons begins at two and one-half to three years; and at three and over there is an eager interest in approval and achievement (10). Interest is variable (10) and extra incentives may be required after the first interest fades (4). Guidance is directed to controlling attention (9), and cooperation, to introducing the processes at the proper level of interest and maturation (8), to giving help upon special difficulties (10), as in laying out clothes, tying bows, and in directing the arm to the proper hole (10). Individual differences of self dependence, self reliance, perseverance, completion of tasks, interests and ease in detail were found to correlate closely with success in buttoning and unbuttoning (2). Some children tend to take responsibility of dressing, others do not (8). The whole dressing process as such affords training in self-help (3, 4, 8, 11, 14).

The one experimental study is of buttoning and unbuttoning and is made from the standpoint of motor control; it was conducted by Armstrong (2, 12). The subjects were 30 children between the ages of one year, nine months and five years, one month. Standardized

jackets were put on the children and the exact manner of manipulating buttons and buttonholes is described. Some of the conclusions in this study have been noted above; other observations were that unbuttoning was easier than buttoning, success on one buttoned jacket correlated with success on a second jacket, manipulation of side buttons was a great deal more difficult than manipulation of front fastenings, one side was as easy to manage as the other, waistline side buttons were more difficult to manage than front waistline buttons. Motor adjustment as measured by buttoning was fairly highly correlated with motor adjustment as measured by certain tests involving motor control and coordination. The scores in buttoning correlated very much higher with performance tests than they did with intelligence as measured by the Stanford-Binet.

THE PROBLEM

The problem of the present study is to find out the average chronological age at which nursery-school children are able to dress themselves, partially or completely, in their own indoor, daytime clothes; and to ascertain to what extent the factors of time, encouragement, interest, intelligence, amount, and style of clothing, and time of entrance into nursery school and attendance there, condition the process of learning. There are limitations within the data itself. For example, there is a comparatively small number of subjects, especially in the first and last two age groups. Statistical refinements do not rectify this difficulty (7). The units

TABLE 1
 DESCRIPTION OF SUBJECTS
 Number, Sex, Chronological Age, Intelligence Quotient, Age at Entrance to Nursery School, Number of Days in Attendance at Nursery School. K = Kuhlmann, SB = Stanford-Binet Intelligence Test, inc = incomplete, abs = absence.

Child No. Sex		CA in mos. Observations Tests						IQ		CA at en- trance		No. days regis. observation			No. days present observation			Age groups in mos. in which observed									
		1 2 3 1 2						1	2	1 2 3		1 2 3			1 2 3			18	24	30	36	42	48				
		in mos.						in mos.											29	35	41	47	53				
1	F	19	20	21	K	K	K	133	146	140	18	12	35	57	12	21	42	✓✓✓									
2	F	19	20	21	K	K	K	inc	103	103	19	0	20	42	0	15	32	✓✓✓									
3	F	23	—	—	K	abs	107	—	107	23	4	—	—	—	4	—	—	✓									
4	M	24	25	26	K	K	inc	123	123	20	75	95	117	72	92	114		✓✓✓									
5	M	27	—	—	K	abs	111	—	111	26	15	—	—	—	9	—	—	✓									
6	M	27	28	29	inc	K	inc	102	102	22	94	115	136	83	102	125		✓✓✓									
7	M	29	—	—	K	abs	141	—	141	23	10	—	—	7	—	—	✓										
8	M	29	30	31	K	abs	129	—	129	28	30	48	63	26	35	47		✓✓									
9	F	30	31	32	K	K	K	131	124	128	25	102	123	145	82	99	116		✓✓✓								
10	F	31	32	33	K	K	K	119	121	120	23	117	141	162	98	119	140		✓✓✓								
11	M	31	32	33	K	K	K	98	135	117	24	101	125	144	98	120	138		✓✓✓								
12	F	31	32	33	K	abs	121	—	121	26	91	123	154	49	65	72		✓✓✓									
13	M	32	33	34	K	K	K	95	100	97	26	107	130	150	90	112	52		✓✓✓								
14	M	33	34	—	K	K	K	114	137	126	28	97	121	—	68	96	—		✓✓								
15	M	36	37	—	K	K	K	104	95	100	35	23	42	—	5	17	—		✓✓								
16	M	36	37	—	K	K	K	101	118	110	35	13	35	—	6	22	—		✓✓								
17	F	38	39	40	K	K	K	90	106	98	33	88	110	133	65	83	100		✓✓✓								
18	M	38	39	40	K	K	K	91	123	107	33	95	116	138	61	77	99		✓✓								
19	M	40	41	—	K	K	K	91	94	93	39	14	37	—	10	33	—		✓✓								
20	M	40	41	42	K	K	K	124	140	132	24	276	295	319	242	259	285		✓✓								
21	F	41	42	43	K	K	K	118	122	120	24	297	321	342	217	256	257		✓✓								
22	M	41	42	43	K	K	K	125	154	140	31	189	210	231	131	143	159		✓✓								

TABLE 1 (continued)

Child No. Sex	CA in mos.			Tests		IO		CA at en- trance		No. days regis.			No. days present			Age groups in mos. in which observed				
	1	2	3	1	2	1	2	1	2	3	1	2	3	1	2	3	18	24	30	36
																	25	29	35	41
23 M	42	43	44	K	K	110	110	26	256	276	298	217	229	245						
24 F	43	44	45	K	K	103	118	111	26	277	311	331	237	271	291					
25 F	44	45	46	K	K	159	135	138	28	146	166	188	117	137	158					
26 F	44	45	46	K	K	116	126	121	23	298	320	342	261	280	302					
27 F	45	46	47	K	K	129	131	131	32	297	324	344	253	285	305					
28 F	46	47	48	K	SB	114	110	112	25	356	375	397	302	318	338					
29 M	46	47	48	K	SB	110	118	114	25	334	348	370	267	280	300					
30 M	46	—	48	K	abs	97	—	97	45	21	—	63	21	—	52					
31 F	46	47	—	K	K	106	110	108	30	259	287	—	222	244	—					
32 F	46	47	48	K	abs	145	—	143	44	32	54	74	22	39	56					
33 F	47	48	49	K	SB	153	133	143	34	259	259	281	201	219	239					
34 M	49	50	51	K	SB	119	124	122	25	361	381	405	281	299	323					
35 M	50	51	52	SB	SB	103	100	102	25	345	365	387	280	298	320					
36 M	50	51	52	K	K	157	142	139	26	390	410	435	306	322	350					
37 F	51	52	53	SB	SB	133	120	127	26	390	412	432	296	311	339					
38 M	51	52	53	SB	SB	125	127	126	22	460	484	506	306	330	349					
39 F	52	—	—	SB	SB	120	120	120	24	395	—	262	—	—	—					
40 M	53	54	55	SB	SB	132	140	136	49	81	103	123	75	95	113					
41 M	55	56	57	SB	SB	127	135	131	50	92	112	134	84	104	126					
42 M	56	57	58	SB	SB	125	125	125	41	161	179	199	123	140	158					
43 F	56	57	58	SB	SB	122	124	123	51	106	128	148	99	121	141					
44 F	60	61	62	SB	SB	125	116	121	43	206	225	246	151	167	188					
45 M	61	62	63	SB	SB	109	100	105	27	465	485	507	385	405	426					

of difficulty are not equal. There were no children to be observed at 18, 22, 35, 59, 64, 65 months.

In spite of these limitations, the study has value for the parent, the nursery teacher, the clinician, the student of learning, and the manufacturer of clothing for children because of the findings as a controlled study of the process of learning to dress.

THE SUBJECTS

The subjects used in this study were 45 children, 25 boys and 20 girls, ranging in age from 19 up to 64 months, who were attending the nursery school of the National Child Research Center in Washington, D. C., during February, March, and April of 1932. Table 1 gives data on the age, sex, intelligence, attendance, and number of observations of these subjects.

The children as a group came from the upper middle-class American home, with more education but with no more wealth than such a home represents. The average IQ given is the result of one test in the cases where only one test was administered; where there were two or more tests, the average is of the first and last test given the child.

II

PROCEDURE

If the learning process in dressing is to be studied, it should be measured in some way. For this reason a scale was constructed by which a child's ability to dress could be stated in quantitative terms. The procedure was as follows: the children were observed for three weeks during their dressing period. Some 65 units of difficulty were apparent in the dressing process. A scale of these units was constructed and is found on p. 78. The method of using and scoring this scale is found on pages 78-84.

The test situation was arranged so that the observer, one of the four nursery teachers working on the study, and the child were alone in a room. The child had had his afternoon nap in his sleeping garment so that he was now ready to dress himself in his own daytime clothes. Each child was observed twice a month for three months. These examinations were made alternately by the two teachers in his group.¹ The two monthly trials were on days nearest his birthdate in the month. This procedure resulted in six observations per child, where the child was present throughout the experiment (cf. Table 1, pp. 74 and 75), and yielded a total of 242 observations on 45 children who were subjects.

The children knew the teachers who were observing

¹ The two teachers who observed the children in the older group (age range 43 to 65 months) were Mrs. Heiney and Miss Erwin; and in the younger group (age range 18 to 42 months) Mrs. White and Mrs. Honzik.

them and they were interested in seeing how well they could dress themselves.

Garters were worn too seldom by the children in this study to score in the final results. The children's interest was rated but has not been considered in the analysis of the results.

The ability of the child to dress is represented by a score. This score is the percentage that the units mastered are of the units present in the clothing worn. For example, if there are 40 units of difficulty in the child's garments and he masters 20, his score would be 50 per cent, or 50. Time and specific abilities should be recorded also on the scoring sheet.

SCALE FOR MEASURING DRESSING ABILITY

Name of Child Date..... Time.....
 Recorder Type of Clothing Worn
 No. Verbal Helps Pertaining to Entire Dressing
 No. Garment Units Worn No. Successes
 Percentage Score Interest (—, +, ++).....
 Distractions (—, +, ++)
 Distractibility (—, +, ++)

Stockings

(1) (2)

....Started over foot
Up on foot
Pulled up
Pulled up correctly
Adjusted if necessary
Article on the right side
One stocking on each
 foot

Shoes

(1) (2)

....Opened
Tongue out
On without forcing
Started on foot
Foot in, heel down
Laced partly
Laced correctly
Laced completely

-Tied with a plain knot
-Tied with a bow knot
-Tied with single bow knot
-On correct foot
-Fastened— buttoned or buckled

Torso

-Garment made ready
-Garment right side out
-Garment pulled over head
-Arm 1 in hole
-Arm 1 in correct hole
-Arm 2 in hole
-Arm 2 in correct hole
-Garment front to front
-Garment adjusted
-Garment buttoned partially
-Garment buttoned completely
-Garment buttoned correctly
-Garment tied or snapped

Leg

-Garment made ready
-Garment right side out
-Leg 1 in hole
-Leg 1 in correct hole
-Leg 2 in hole
-Leg 2 in correct hole
-Garment pulled up
-Garment front to front
-Garment adjusted

-Garment buttoned partially
-Garment buttoned completely
-Garment buttoned correctly

Torso and Leg

-Garment made ready
-Garment right side out
-Leg 1 in hole
-Leg 1 in correct hole
-Leg 2 in hole
-Leg 2 in correct hole
-Arm 1 in hole
-Arm 1 in correct hole
-Arm 2 in hole
-Arm 2 in correct hole
-Garment buttoned partially
-Garment buttoned completely
-Garment buttoned correctly
-Garment fastened

Dress and Petticoat

-Garment made ready
-Garment right side out
-Arm 1 in hole
-Arm 1 in correct hole
-Arm 2 in hole
-Arm 2 in correct hole
-Head in hole
-Garment front to front
-Garment adjusted
-Garment buttoned partially

....Garment buttoned completely	<i>Garters</i>
....Garment buttoned correctly	(1) (2)
....Garment fastened	....Pull up round garters
	....Snap on buckled garters
	....Adjust supporters
	....Fasten supporters

DIRECTIONS FOR SCORING

1. The child is taken into testing room with observer. The child should have been to the toilet and should be entirely undressed.
2. The child sits on a floor mat or on a low bench with his clothing on a small rug in front of him.
3. The clothing is arranged as follows: all clothing separated, straightened and turned right side out; high shoes partially unlaced, low oxfords untied, sandals unbuckled; and all openings necessary for dressing unfastened. For example: in cases where the garment is a suit and the upper part is buttoned onto the lower, the garment is left as one garment either by leaving the back or front buttons fastened, and the child is allowed to put on the garment as a one-piece garment.
4. The observer tells the child, "I want you to show me how well you can dress yourself today."
5. To score the time required to dress, the observer should start the stop-watch as soon as the child attempts to put on the first article of clothing, and stop the watch when the child is dismissed as dressed.
6. As the child puts on his clothing, the observer should record the number of *verbal helps* for each article of clothing, and at the end of the dressing period, sum up the total number of such helps and record them as the total number of verbal helps the child required.
7. The *percentage* score, which represents in quantitative terms the child's ability to dress, is found by dividing the number of dressing units in the garments worn by the sum of the number of successes on such units plus

the number of spontaneous corrections on the units,
e.g.,

$$\frac{\text{No. of units worn}}{\text{No. of successes plus No. of spontaneous corrections}} = \% \text{ success}$$

8. *Interest, distractions, distractibility* may be scored, —, +, ++, in comparison to such behavior in the average child of the same chronological age.

9. *Cooperation and Experience*

Cooperation equivalent to that required for mental testing should be expected, i.e., the child should be trying to dress to the best of his ability. The observer should be familiar with the scale and sufficiently familiar with the child to know if his refusals are confessions of actual inability. In some cases it may be advisable to have the child "dressed" by one who is acquainted with the child, knows his approximate skill, and can win his cooperation. In such cases the observer merely watches unobtrusively, and records.

10. *Scoring is invalidated* if the garments are faulty, e.g., button holes that won't stay fastened, socks or shoes that are too tight for the child to adjust; garments that cling. Where no other score is available and a rough score is wanted, the items affected should be marked o, i.e., omitted.

11. *Scoring*

- a. If any item, i.e., dressing unit, under Main Headings (Stockings, Shoes, etc.) is scored, then every item under that heading must be scored, (i.e., if under *Leg* garment "leg 1 in hole" is scored, then all other items under *Leg* must be scored.)
- b. Score plus (+) for successful performance.
- c. Score minus (—) for failure.
- d. Score zero (o) for unnecessary or omitted items (i.e., if a child puts on oxford without unlacing it, items shoes "laced correctly," "laced completely," "laced partially," will be scored "o").

- e. A successful performance is one wherein the child succeeds in executing a unit in the first trial without *manual* help from the teacher; or one wherein the child spontaneously corrects his own error.
 - f. An item that is scored as a failure is one wherein the child does not spontaneously correct his error. The child also fails when he has to be specifically instructed by the teacher how to make a movement or handle a garment; or given actual assistance in making a movement or in handling a garment.
 - g. If a child puts an article on in such a way that further correct dressing is not possible without first removing the garment, the performance up to that point is scored. When the garment is put on the second or succeeding times and the child corrects some of the errors made in the first trial, these corrections are recorded as [—] and counted as successes equal to $\frac{1}{2}$ units. A complete record, therefore, gives the scores on the first attempt and indicates the total number of successes, corrected failures, uncorrected failures, and failures on the completed performances.
 - h. Any suggestions made to a child *encouraging* him but *not instructing* him how to dress should be counted as a verbal help. Short continuous suggestions on a single article of clothing or a series of suggestions, on a single article, broken by a child's conversation should be counted as one verbal help. The observer should not tell the child how to dress except as a substitute for manual help, and such instruction is equal to a manual help; the unit, therefore, is scored as failed.
12. The following is a list of the various types of garments. The observer should indicate on the scoring sheet the clothing worn by the child (A1, B2, etc.).

A. Stockings

1. Short socks
2. Long socks
3. Stockings

B. Shoes

1. High lace
2. Low lace
3. Slippers (button or buckle)
4. Sandals

C. Torso

1. Slipover shirts
2. Buttoned shirts
3. Tie
4. Body underwaists
5. Suspender waists
6. Slipover outer suit waist
7. Buttoned outer suit waist

D. Leg

1. Under pants with rubber
2. Under pants with buttons
3. Outer pants with rubber
4. Outer pants with buttons

E. Torso and Leg

1. One piece underwear buttoned in front
2. One piece underwear buttoned in back
3. One piece with no fastenings
4. One piece outer suits buttoned in front
5. One piece outer suits buttoned in back

F. Dress and Petticoat

1. Petticoats over head without fastenings
2. Petticoat over head with fastenings
3. Dress over head with fastenings in front
4. Dress over head with fastenings in back
5. Dress with opening down entire front

G. Garters

1. Round garters
2. Buckled garters
3. Suspenders

13. *Detailed explanation* for scoring the dressing units.

- a.* All dressing units present or absent in each article of clothing worn by the child should receive some score, i.e., —, +, 0, or [—].
- b.* The garments are made ready for the child to put on, "shoes opened," "tongue out," "garment on right side." If the child is able to keep them in this position the scores are (+) on these items. If,

however, he gets the garment out of the given position and is able to put it back into position, the score is [—]; or, if he must have the observer help him to get the garment into position again, the units mentioned are corrected as failures and the score is (—).

- c. In the units "pulled up correctly," "laced correctly," "buttoned correctly," "in correct hole," "correctly" implies: pulled up to at least the approximately proper position and not markedly askew; laces in alternate holes; no skipped holes; buttons in holes made for them; arms in holes intended.
- d. In "laced partially," or "buttoned partially," "partially" implies that some lace or button is put into at least one eyelet or hole. Laced or buttoned completely implies that the garment is laced or buttoned from top to bottom, or from side to side; the buttons or laces may be in the wrong holes, but the garment could be worn "as is."
- e. Garment adjusted implies that the garment is pulled sufficiently into position so that it does not interfere with wearing another garment. This does not mean that adult standards are adhered to, i.e., the seam of the stocking in the center back of the leg, shirts tucked smoothly into bloomers, collars pulled straight, it means rather that the heels of the stocking should be on the heel and not on the top or side of the foot, torso or leg garments should be pulled over or under bloomers so that further dressing is possible.
- f. "Garment pulled over head," "head in hole" imply that the head appears through the neck hole. For example, a child might choose to step into an over-head shirt.
- g. "Fastened" means any other fastening not mentioned previously under the particular garment.

III

RELIABILITY OF THE SCALE

The reliability of the scoring method used is indicated by the correlation between ability scores (in terms of percentage of success) obtained by the children on the *first* two successive days on which they were observed. This coefficient was found to be $+.90 \pm .02$, and with CA partialled out $+.78 \pm .04$.² These coefficients indicate a high degree of reliability in the method used to measure the children's ability to dress themselves. It will be remembered that a different teacher observed the children on the two successive days, a fact which would tend to lower the coefficient. The reliability coefficient cited was based on the first pair of observations for each child; coefficients were not obtained for the second and third series of observations.

² The correlation between CA and dressing scores earned on the first day is $+.72 \pm .05$; and between CA and dressing scores earned on the second day is $+.78 \pm .04$.

Formulae:

$$r = \frac{\Sigma xy - cxcy}{\sigma x \sigma y}$$

$$\text{P.E.} = \pm \frac{.6745 (1-r^2)}{\sqrt{N}}$$

IV

ABILITY TO DRESS

Ability of the nursery-school child to dress himself was measured by the percentage which the dressing units mastered were of the total number of dressing units present in the clothing worn by the child at the particular observation.^a

Table 2 should be examined for the scores.

By an examination of Table 2 it will be seen that:

1. There are large individual differences in the ability to dress within the same age group. These differences are greatest from one and one-half to three and one-half years, and decrease from then on.

2. A child from one and one-half to two years can master 12 to 63 per cent of the dressing units; a child of four and one-half to five may completely dress himself.

3. Girls tend to show greater ability to dress themselves than boys between two and one-half and four

^a Table 2 has six sections and two methods of treatment of data; Method *a* and Method *b*. Method *a* used all observations on all the children. This method may over-weigh the observations within an age group by as many as six observations on one child and one on another. To obviate this difficulty, Method *b* was used as a check. Method *b* uses two and only two consecutive observations per child within an age group. The rule for the selection of cases required the selection of the first two observations on a child, provided such selection secured the most even distribution of the number of cases per month within the age group, otherwise the second two observations, or the third two in order to secure the even distribution mentioned. This Method *b* is not applicable to sex differences in this study because of the small number of cases when so divided. The results obtained by Method *a* and *b* were very similar.

TABLE 2
ABILITY TO DRESS (PERCENTAGE OF SUCCESS)
THE PERCENTAGE OF DRESSING UNITS MASTERED OF THE DRESSING UNITS IN
THE CLOTHING WORN

Mean, P.E., σ , Quartiles and range calculated from the records of 45 nursery-school children
Method *a* at the rate of two observations a child a month for three months.
Method *b* at the rate of two observations only a child within an age group
Sections 1, 2, 3, 4, 5, 6.

Age group	I	II	III	IV	V	VI	VII	VIII
Age range	18-23 mos.	24-29	30-35	36-41	42-47	48-53	54-59	60-65
No. of children	3	5	7	8	14	12	4	2
Section 1								
<i>a.</i>								
All observations								
No. of observ.	14	18	38	32	60	46	22	12
Mean	43.5 %	50.06	69.29	77.84	90.22	87.48	96.23	93.17
P.E. _{\bar{M}}	2.41	1.94	1.72	1.63	.52	1.06	.47	.56
σ	13.38	12.21	15.76	13.64	5.92	10.70	3.24	2.85
P.E. _{σ}	1.71	1.37	1.22	1.15	.36	.75	.33	.39
25 percentile	37	42	55	67	87	85	93	91
50 percentile	47	51	73	84	91	91	98	94
75 percentile	51	60	82	89	94	93	98	96
Range	12-63	22-72	35-93	48-92	64-100	44-98	90-100	88-98
Section 2								
<i>b.</i>								
Two observations per child								
No. of observ.	6	10	14	16	28	24	8	4
Mean	38.67%	44.30	67.72	77.81	88.14	85.93	94.	91.75
P.E. _{\bar{M}}	4.73	2.51	2.43	2.59	.83	1.92	.82	.83
σ	17.19	11.76	13.49	15.36	6.51	13.39	3.43	2.47
P.E. _{σ}	3.35	1.77	1.72	1.83	.59	1.36	.58	.59
25 percentile	25	42	59	72	85	85	91	90
50 percentile	40	46	66	85	89	91	93	93
75 percentile	57	49	82	89	92	92	97	94
Range	12-58	22-62	47-86	48-92	64-98	44-98	90-100	88-94
Section 3								
<i>a.</i>								
Boys								
All observations								
No. boys	0	5	4	6	5	7	3	1
No. observ.	0	18	20	24	18	30	16	6
Mean		50.06	58.1	75.96	85.17	85.07	95.31	92.67
σ		12.21	12.53	15.30	6.02	12.42	3.29	2.05
25 percentile		42	49	65	84	82	93	91
50 percentile		51	56	84	86	90	96	94
75 percentile		60	68	90	89	92	98	94
Range		22-72	35-82	48-92	64-92	44-98	90-100	89-95

TABLE 2 (continued)

Age group	I	II	III	IV	V	VI	VII	VIII
Section 4								
<i>a.</i>								
Girls								
All observations on								
No. girls	3	0	3	2	9	5	1	1
No. observ.	14	0	18	8	42	16	6	6
Mean	43.5 %		81.72	83.5	92.39	92.	98.67	93.5
σ	13.38		7.48	3.43	4.35	2.92	.94	3.20
25 percentile	37		79	81	89	91	98	91
50 percentile	47		83	83	93	91	98	95
75 percentile	51		87	87	96	94	100	96
Range	12-63		64-93	79-89	82-100	88-98	98-100	88-97
Section 5								
<i>b.</i>								
Best trial of 2 monthly observ. per child								
No. observ.	7	9	19	16	30	23	11	6
Mean	49.0 %	57.11	73.16	80.06	92.63	90.52	97.18	94.5
σ	11.15	8.16	14.03	12.75	4.43	5.85	2.46	2.22
25 percentile	46	49	61	70	89	88	95	93
50 percentile	51	60	75	87	92	91	98	95
75 percentile	58	62	86	89	97	94	100	96
Range	25-63	45-72	48-93	48-92	85-100	74-98	93-100	91-98
Section 6								
<i>b.</i>								
Poorest trial of 2 monthly observations per child								
No. observ.	7	9	19	16	30	23	11	6
Mean	38.0 %	43.	65.42	75.63	87.8	84.44	95.27	92.17
σ	13.16	10.95	16.43	14.13	5.55	13.28	3.45	3.30
25 percentile	31	40	49	67	85	79	92	89
50 percentile	38	42	64	81	88	90	98	92
75 percentile	48	52	81	85	93	92	98	94
Range	12-57	22-58	35-87	48-90	64-96	44-98	90-100	83-96

and one-half years of age. The variability in skill is greater among boys than girls.

4. If we record the lowest 25 percentile score and the lowest score of the Sections on: all the observations, on two observations per child, and on the poorest and on the best trials in Table 2, we may state from inspection that a *conservative estimate* of the ability of the nursery-school child to dress himself is as follows:

CA	2 yrs.	2½	3	3½	4	4½	5
Range of percentage of success from lowest score to 1st quartile	12-25	22-40	35-49	48-67	64-85	44-79	90-91
(In round numbers)	10-25	20-40	35-50	50-70	65-85	7-80	90-90

V

LEARNING TO DRESS

In this section the progress in learning to dress is considered.

For the *group* and for the *individual*, *chronological age* is a most potent factor in determining the learning level in dressing. This is a commonly accepted fact. In this study this same fact is indicated in the section on reliability where the correlation between age and ability to dress was $+.72$ and $+.78$, for the first and second observations respectively. Likewise, a high positive correlation was indicated by the continuous increase in the average scores with age in the section on ability to dress. Table 3 and Figure 1, that follow

TABLE 3
THE ABILITY TO DRESS
Relation of dressing scores to Chronological Age (all observations).

Dressing scores	Chronological age groups							
	I	II	III	IV	V	VI	VII	VIII
90-100			2	4	12	28	22	10
80- 89			12	17	26	11	0	2
70- 79		1	7	2	1	5	0	0
60- 69	1	4	5	5	1	0	0	
50- 59	4	4	6	2	0	1		
40- 49	4	7	5	2	0	1		
30- 39	3	0	1					
20- 29	1	2						
10- 19	1							
Number of cases	14	18	38	32	60	46	22	12

and represent the relation of increase in learning skill to age, indicate the same positive relationship.

Moreover, the correlation ratio between age and the ability scores in dressing for all observations is

$\pm .85 \pm .02$. It seems evident that age largely determines a child's ability and learning skill in dressing. And it is in this preschool period, between the ages of 18 to 65 months, that children progress from very little ability to dress to almost perfect ability.

For the *group* as a whole, learning to dress is a continuous process, but the *rate of progress* varies: it is sometimes accelerated, sometimes retarded. Between one and one-half and two and one-half years the increase in learning is rapid. This tendency continues with individual differences until, after three and one-half years, the children improve at a less rapid rate. (Table 3, Figure 1.)

If we drew a learning curve through the medians of Table 3 to show the progress in the rate of learning, it would pass through scores in the 40, 50, 70, 80, 90, 90, 90 percentages of success for the consecutive age groups. The plateau in the highest age levels may be accounted for by the inclusion in the scale of a few very difficult units, as tying the shoe; and by the absence in the scale of a sufficient number of challenging but not-too-difficult units that would have distributed the scores of the older children.

For the *individual*, the learning process is continuous, but unstable. An individual's score usually shows a gain from one trial to the next, but not always.

An inspection of Figure 1 and Table 4 for these gains and losses for individual children is interesting.

FIGURE 1
 PERCENTAGE OF SUCCESS IN DRESSING
 PERCENTAGE SCORES OF INDIVIDUAL CHILDREN
 OBSERVATIONS EXTENDED OVER A 3 MONTHS PERIOD AND
 CHILDREN WERE OBSERVED ON THE TWO DAYS NEAREST
 THEIR MONTHLY BIRTH DATE

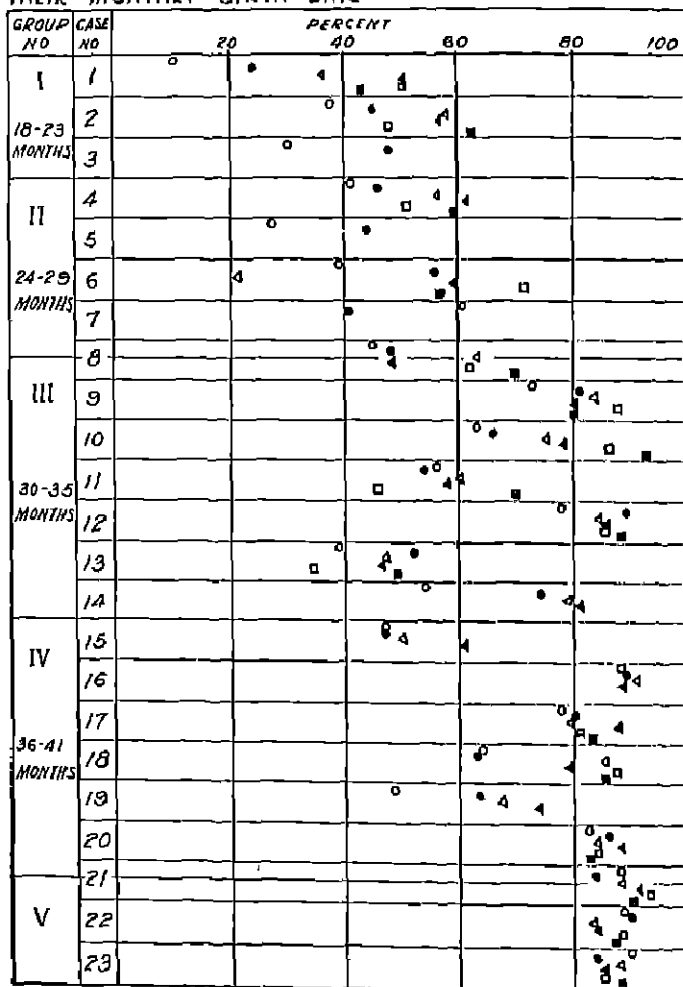
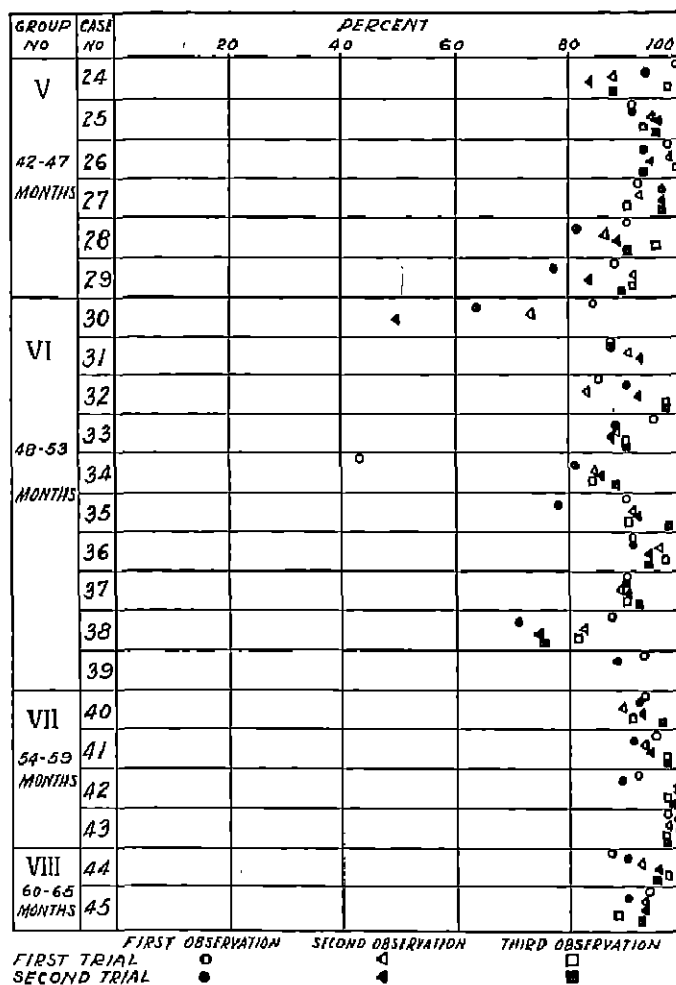


FIGURE 1 (continued)*



*In Case 40, the percentage value of ● should be 92.

TABLE 4
LEARNING TO DRESS
The best trials, percentage of success, for the three successive observations of 45 children. Blanks represent absence.

Age in mos. Age group No. of child	18-23 I			24-29 II			30-35 III			36-41 IV			54-59 VII			60-65 VIII											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	41	42	43	44	45
Percentage success, 1st mo.	25	46	49	47	45	57	62	49	82	67	57	90	55	75	48	90	81	65	65	87	89	92	96	93	100	91	95
Percentage success, 2nd mo.	51	58		62	60			64	84	69	61	86	48	82	62	92	88	86	75	89	92	85	95	100	100	96	94
Diff. between 1st & 2nd mo.	26	12		15	3			15	2	2	-6	-4	-5	7	14	2	7	21	10	2	3	-7	-1	-1	7	0	5
Percentage success, 3rd mo.	51	63		60	72			71	88	93	71	89	50				8+	88		85	94	89	97	98	98	98	93
Diff. between 1st & 3rd mo.	26	17		13	15			22	6	26	14	-1	-3				3	23		-2	5	-3	3	2	6	-2	7
Diff. between 2nd & 3rd mo.	0	5		-2	12			7	4	24	10	5	2				+	2		+	2	4	+	3	-1	-2	2

Age in mos. Age group No. of child	42-47 V			48-53 VI			54-59 VII			60-65 VIII													
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Percentage success, 1st mo.	91	100	92	98	97	91	89	85	88	91	96	82	91	92	91	88	99	94	96	93	100	91	95
Percentage success, 2nd mo.	89	84	57	98	97	89	92	93	93	89	86	93	97	91	83				95	95	100	100	96
Diff. between 1st & 2nd mo.	-2	-16	-35	0	0	-2	3		5	2	-7	4	2	5	0	-5			-1	-1	7	0	5
Percentage success, 3rd mo.	89	98	96	100	97	96	92	74	98	91	89	98	93	93	82				97	98	99	98	93
Diff. between 1st & 3rd mo.	-2	-2	4	2	0	5	3	-11	7	-5	7	7	6	2	-6				3	2	6	-2	7
Diff. between 2nd & 3rd mo.	0	14	39	2	0	7	0		5	2	3	5	1	2	-1				4	3	-1	-2	2

From Table 4 we can calculate:

	No. cases	No. scores showing:			Total loss in score points	Total gain in score points
		Loss	No change	Gain		
1st to 2nd month	40	13	3	25	91	178
1st to 3rd month	36	9	1	24	41	231
2nd to 3rd month	35	7	3	25	15	165

The decrease in the losses (greater success from one month to the next) may be in part due to the child's familiarity with the situation and to the observer's more skillful use of the scale. But it is judged the decrease is primarily due to increase in skill; cf. p. 85, correlation $+.78 \pm .04$ between Trial 1 and 2, CA partialled out.

The general *conclusion* from the above discussion is that learning to dress between the ages of one and one-half and five and one-half years is a continuous, increasingly difficult, and unstable learning process. It is largely dependent on chronological age (correlation ratio $+.85$), and may be acquired by the normal child in the preschool years. The most rapid learning occurs between one and one-half and three and one-half years; the most marked individual differences between two and one-half and three and one-half years.

VI

ABILITY TO PUT ON THE SEPARATE GARMENTS

In order further to analyze a child's ability to dress, it seemed worth while to discover what in the dressing process was easy and what difficult. It seemed probable that some garments would be more difficult to put on than others.

Table 5 shows that young children between the ages of one and one-half and three years vary so among themselves in their ability to put on the separate garments that an average percentage of success for each garment is unreliable. The relation of the sigmas to the means indicates this. After three years of age, however, the mean percentage of success does represent an increasingly reliable measure. Stockings and leg garments are the first to show an average performance that is highly reliable.

If garments are studied by examining the average success, sigma, and range, and are ranked in order of difficulty from the least to the most difficult garment for the child to put on, some facts are indicated:

	Stocking	Shoes	Torso	Leg	Torso- leg	Dress and petticoat
Av. of ranks of means of gr. I, II, III, IV	2	6	5	1	4	3
Av. of ranks of means of gr. V, VI, VII, VIII	1	6	2	3	3	5
Av. of ranks of means of gr. IV, V, VI	1	5	4½	2	3	4½
Av. of ranks of means of all groups	1	6	5	2	4	4

TABLE 5
ABILITY TO PUT ON SEPARATE GARMENTS

The percentage of success $\left(\frac{\text{successes}}{\text{successes plus failures}} \right)$ for each garment in all the 242 observations on all the 45 children

Garments	Percentage of success										Rank			
	Stock-ings (prs.)	Shoes (prs.)	Torso	Leg	Torso-leg	Dress or petticoat (prs.)	Gar-ters (prs.)	Stock-ings (prs.)	Shoes (prs.)	Torso	Leg	Torso-leg	Dress or petticoat	
Group I														
No. of children wearing garments	3	3	3	3	0	3	0							
No. of garments worn	14	14	16	23	0	20								
Mean	48%	26%	31%	67%		41%								
σ	31.5	17.8	14.6	18.6		22.2								
Range	0-92	0-55	0-75	30-100		0-89								
Group II														
No. of children wearing garments	5	5	5	5	5	0	0							
No. of garments worn	18	18	13	13	23	0								
Mean	68	54	32	68	35			1½	3	5	1½	4		
σ	29.6	12.9	22.9	31.9	16.3									
Range	0-100	25-69	0-70	0-100	0-59									
Group III														
No. of children wearing garments	7	7	3	3	4	3	1							
No. of garments worn	38	38	27	32	34	26	5							
Mean	82	54	60	83	75	76		2	6	5	1	4	3	
σ	20.1	21.4	28.1	16.5	19.9	15.6								
Range	29-100	5-82	0-100	56-100	38-100	33-90								
Group IV														
No. of children wearing garments	8	8	5	5	8	1	3							
No. of garments worn	32	32	21	19	45	2	8							
Mean	86	71	81	85	78	78		1	6	3	2	4½	4½	
σ	14.6	8.4	20.4	14.5	23.0	22.0								
Range	57-100	45-82	33-100	58-100	55-100	56-100								

TABLE 5 (continued)

Garments	Stock- ings (prs.)	Shoes (prs.)	Torso	Leg	Torso- leg	Dress or peltic- coat	Gar- ters	Stock- ings (prs.)	Shoes (prs.)	Torso	Leg	Torso- leg	Dress or peltic- coat
Percentage of success													
Group V	Rank												
No. of children	14	14	7	10	13	9	3						
wearing garments													
No. of garments	60	60	24	42	66	45	7						
worn	98	77	83	98	97	91		1½	6	5	1½	3	4
Mean	7.5	15.2	24.3	9.2	7	8							
σ													
Range	50-100	25-100	0-100	42-100	71-100	75-100							
Group VI	Rank												
No. of children	12	12	5	8	11	5	3						
wearing garments													
No. of garments	46	46	18	28	61	16	10						
worn	98	72	89	96	95	59		1	6	4½	2	3	4½
Mean	5.3	12.1	12.9	9.9	8.9	6.3							
σ													
Range	71-100	0-100	25-100	58-100	0-100	75-100							
Group VII	Rank												
No. of children	4	4	4	4	4	1	1						
wearing garments													
No. of garments	22	22	24	10	27	6	5						
worn	100	88	98	99	99	98		1	6	4½	2½	2½	4½
Mean	0	11.7	5.8	3.0	3.4	3.7							
σ													
Range	100-100	68-100	75-100	89-100	85-100	90-100							
Group VIII	Rank												
No. of children	2	2	2	2	2	1	1						
wearing garments													
No. of garments	12	12	11	11	13	6	2						
worn	100	81	99	100	97	97		1½	6	3	1½	4½	4½
Mean	0	7.7	3.2	0	6.1	4.7							
σ													
Range	100-100	63-90	89-100	100-100	79-100	90-100							
Ave. of ranks								1	6	5	2	4	4

Stockings and leg garments appear the easiest garments to learn to put on, stockings becoming the easier of the two. Next, torso-leg garments are perhaps a little easier than dresses and petticoats, and torso garments. The differences in difficulty between these three garments becomes less with Group 4, or with the three to three and one-half-year olds. Between one and one-half and two and one-half years, some other garments are as difficult as shoes, but later shoes continue to contain unmastered units, making them the most difficult garment to put on without help.

CONCLUSIONS

1. There are wide individual differences in ability to put on the separate garments.
2. The average percentage of success in putting on separate garments can be said to be a reliable standard, on the whole, after the three and one-half-year age level.
3. Some garments are easier to learn to put on than others. Stockings and leg garments are the easiest to put on. Torso, torso-leg, and dresses and petticoats are of about equal difficulty. Shoes contain units that are unmastered until the last age group, making them in all the most difficult article to put on without help.

VII

ABILITY TO MASTER THE SEPARATE DRESSING UNITS

From this section the parent and teacher should know at each age level when to assist and teach, and when to expect success on the individual dressing units. The clinician should find useful clues as to over-protection, dawdling, general intelligence, and motor co-ordination if he measures his patient against these standards. The manufacturer of children's clothing should see where he may best omit and introduce certain dressing units into garments. It also suggests that if maturation is an important concept in learning to dress, as in other learning processes, guidance is an important and perhaps a more fruitful concept, if we consider the variability in success, the multiplicity of units, and the degrees of learning.

The difficulty of the various dressing units is measured by the percentage of children successful on that unit.

Two methods were used in presenting the data in order to bring the results into relief: Methods x and y . Method x consists in finding what percentage the successes were of the successes and failures on a given unit within a given age group. Method y represents a higher degree of learning, "100 per cent" learning, in that only these successes were counted where the child succeeded on a unit one out of one, two out of two, three out of three, or four out of four consecutive trials. This meant the child never failed in any of the trials for the

month studied. Although the number of children and observations on each unit is not given, the number of children and number of garments observed may be seen in Table 5, pp. 97-98. The findings of Methods x and y are about the same, except that y is probably more analytical and presents a higher standard of success. The number of observations on garters was too small to consider. The few cases where Method y gives an earlier age level of success than Method x are cases where complete learning was for one out of one attempt only.

From inspection of Table 6, the easy and difficult units in each garment may be found.

1. In stockings it is easy to learn to keep the stocking right side out and to put only one stocking on one foot; next, pulling up a stocking is easy as a rule, whereas getting a stocking on the foot and over the heel may or may not be as easy; adjusting is the last unit learned.

2. In shoes, starting the shoe on the foot is the easiest unit; to put it on the correct foot (partly because if one shoe is gotten on correctly, the other must needs be correct) is as easy as keeping the shoe opened, getting the heel down and lacing partly. Lacing correctly, then completely, come next, while tying or fastening and putting on without forcing are units that are not fully mastered by the five-year-old. Pulling on without forcing is, no doubt, an adult-value, and it is interesting that it is so difficult to learn.

3. In torso garments, leg, torso and leg, and dress and petticoat garments there are 18 different units. If we list these together with the age level in which

TABLE 6
THE ABILITY TO DRESS
The special ability to master the separate dressing units. The total number of successes for all 45 children in terms of % of success for each unit. $\frac{\text{successes}}{\text{successes} + \text{failures}} = \% \text{ of success. } 0 = 0\%, \text{ --- no incidence of unit in clothing of children observed.}$
X. % all successes were of all failures and successes.
Y. % of all "100% learning" successes were of all failures and successes.

		Stockings													Shoes						
I. % of all 100/0 remaining		Stockings													Shoes						
		1. Started over foot	2. Up on foot	3. Pulled up	4. Pulled up correctly	5. Adjusted if necessary	6. Article on right side	7. One stocking on each foot	1. Opened	2. Tongue out	3. On without forcing	4. Started on foot	5. Foot in, heel down	6. Laced partly	7. Laced correctly	8. Laced completely	9. Tied with plain knot	10. Tied with bow knot	11. Tied with single knot	12. On correct foot	13. Fastened—button or buckle
X.																					
Age Groups		57	46	46	36	0	68	71	71	57	43	71	46	18	0	0	0	0	0	0	43
I		64	68	81	56	0	86	89	88	91	64	100	93	82	4	4	0	0	0	0	83
II		87	84	86	78	19	100	96	79	70	51	88	78	69	26	29	0	0	0	0	79
III		91	97	100	78	23	100	98	100	98	75	100	98	92	51	79	0	0	0	0	98
IV		100	98	98	71	100	100	99	100	98	68	98	97	97	89	97	21	2	0	0	90
V		100	99	100	99	85	100	99	98	93	57	95	80	89	86	44	23	6	—	97	100
VI		100	100	100	100	100	100	100	100	97	100	100	100	100	100	100	64	47	100	100	100
VII		100	100	100	100	100	100	100	100	100	79	96	96	100	100	100	30	0	0	100	50
VIII		100	100	100	100	100	100	100	100	100	79	96	96	100	100	100	30	0	0	100	50
Y.																					
I		57	14	29	29	0	58	57	43	29	14	57	14	14	0	0	0	0	0	0	29
II		44	44	67	44	0	67	78	78	78	22	100	78	57	14	14	0	0	0	0	55
III		79	74	74	63	5	100	89	53	47	32	79	63	50	10	20	0	0	0	0	53
IV		74	94	100	63	13	100	94	100	94	50	100	94	82	18	64	0	0	0	0	88
V		100	97	97	93	60	100	100	97	100	43	95	90	89	74	89	14	0	0	0	80
VI		100	96	100	96	70	100	96	96	82	35	87	74	82	73	39	14	5	—	91	100
VII		100	100	100	100	100	100	100	100	89	27	100	100	100	100	100	56	44	100	100	100
VIII		100	100	100	100	100	100	100	100	100	33	83	83	100	100	100	17	0	0	100	0

TABLE 6 (continued)

TABLE 6 (continued)

Dress and Petticoat																			Garters																		
		1. Garment made ready		2. Garment right side out		3. Arm 1 in hole		4. Arm 1 in correct hole		5. Arm 2 in hole		6. Arm 2 in correct hole		7. Head in hole		8. Garment front to front		9. Garment adjusted		10. Garment buttoned partially		11. Garment buttoned completely		12. Garment buttoned correctly		13. Fastened		1. Pull up round garter		2. Snap on buckle garters		3. Adjust supporters		4. Fasten supporters			
X.	Age Groups																																				
I	35	70	55	45	25	20	70	53	33	0	67	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100		
II	92	96	96	88	92	79	96	77	91	29	57	29	50	38	50	33	50	33	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
III	100	100	100	100	100	50	50	50	100	100	50	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
IV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VI	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VII	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VIII	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
Y.																																					
I	0	57	43	14	14	14	43	43	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100		
II	78	89	89	67	78	44	89	44	56	20	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100		
III	100	100	100	0	100	0	0	0	0	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	100	100	100	100	100	100	100	100		
IV	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VI	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VII	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
VIII	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		

NOTE: X. The numbers in bold-face type represent a profile line which indicates the age group at which, or older, 50% or more of all attempts were successes within the age groups.

Y. The numbers in bold-face type represent a profile line which indicates the age group at which, or older, 50% or more of all attempts were "100% learning" successes for the month within the age group.

0. The cases where there were 0% success both by method X. and Y.

TABLE 6a
ABILITY TO MASTER THE SEPARATE DRESSING UNITS
Age groups in which units mastered

Unit	Torso		Leg		Torso-Leg		Dress petticoat	
	x	y	x	y	x	y	x	y
Made ready	3	4	1	3	3	4	3	3
On right side	1	2	1	1	2	2	1	1
Pulled over head	3	1					1	5
Arm 1 in hole	3	4			3	3	1	3
Arm 1 in correct hole	3	4			3	3	3	5
Arm 2 in hole	3	4			3	3	3	3
Arm 2 in correct hole	4	4			3	3	3	5
Leg 1 in hole			1	1	2	2		
Leg 1 in correct hole			1	1	2	2		
Leg 2 in hole			1	3	2	3		
Leg 2 in correct hole			2	3	2	3		
Garment front to front	3	5	4	4			1	5
Garment adjusted	3	4	3	4			3	5
Garment buttoned partially	4	7	5	5	4	3	5	6
Garment buttoned completely	4	7	7	4	5	5	7	7
Garment buttoned correctly	4	7	5	5	3	3	7	7
Garment pulled up			1	1				

the unit is mastered according to x and y learning methods, certain indications will appear. It is easy to pull up a leg garment; it is also easy to put a first leg into a hole, especially if the garment is not complicated as a torso-leg garment. To keep a garment on the right side may be easy but not invariably so, and not so in the complicated garment. To "make

a garment ready," i.e., to keep it in position to put on, is usually fairly difficult. A little more difficult than putting the first leg in the correct hole is to get the second leg in the correct hole. This difficulty suggests the child's weakness in perception of cues and orientation; e.g., seeing himself into the garment. To manage arms and arm holes is more difficult than leg holes. The complication of the torso-leg garment, however, is offset by the directing value of the torso-leg garment—after the legs are in, the arms are more or less guided. Orientation and the necessity to note cues and important relations seems to make it difficult to keep the garment front to front and adjust it. Buttons appear as the most difficult unit. Partial and complete mastery of buttons are quite widely separated in age levels. Buttons on dresses are particularly difficult, probably because of size and placement; torso-leg buttons are easier, probably for the reverse reasons; e.g., larger buttons down the front. Leg garment buttons would bring in problems of position.

These facts may be stated in another way.

Table 7 represents the age levels at which, according to Methods *x* and *y*, a child masters the separate dressing units. It may be analyzed as follows, using success on *x* and on *y* as the criteria of mastery.

An average child from one and one-half to two years may be expected to keep his stocking on the right side, put one stocking on one foot, start his shoe on his foot, pull a torso garment over his head, get the first leg into the correct hole, keep the garment front to front, and keep a dress right side out.

TABLE 7 (continued)

TABLE I (continued)										
Age levels in yrs.	1½- 2	2- 2½	2½- 3	3- 3½	3½- 4	4- 4½	4½- 5	5- 5½		
Age groups	I	II	III	IV	V	VI	VII	VIII		
Method	X					Y				
Torso and leg										
1. Garment made ready	+	+	+	+	+	+	+	+	+	
2. Garment right side out	+	+	+	+	+	+	+	+	+	
3. Leg 1 in hole	+	+	+	+	+	+	+	+	+	
4. Leg 1 in correct hole	+	+	+	+	+	+	+	+	+	
5. Leg 2 in hole	+	+	+	+	+	+	+	+	+	
6. Leg 2 in correct hole	+	+	+	+	+	+	+	+	+	
7. Arm 1 in hole	+	+	+	+	+	+	+	+	+	
8. Arm 1 in correct hole	+	+	+	+	+	+	+	+	+	
9. Arm 2 in hole	+	+	+	+	+	+	+	+	+	
10. Arm 2 in correct hole	+	+	+	+	+	+	+	+	+	
11. Garment buttoned partially	+	+	+	+	+	+	+	+	+	
12. Garment buttoned completely	+	+	+	+	+	+	+	+	+	
13. Garment buttoned correctly	+	+	+	+	+	+	+	+	+	
14. Garment fastened	+	+	+	+	+	+	+	+	+	
Dress and petticoat										
1. Garment made ready	+	+	+	+	+	+	+	+	+	
2. Garment right side out	+	+	+	+	+	+	+	+	+	
3. Arm 1 in hole	+	+	+	+	+	+	+	+	+	
4. Arm 1 in correct hole	+	+	+	+	+	+	+	+	+	
5. Arm 2 in hole	+	+	+	+	+	+	+	+	+	
6. Arm 2 in correct hole	+	+	+	+	+	+	+	+	+	
7. Head in hole	+	+	+	+	+	+	+	+	+	
8. Garment front to front	+	+	+	+	+	+	+	+	+	
9. Garment adjusted	+	+	+	+	+	+	+	+	+	
10. Garment buttoned partially	+	+	+	+	+	+	+	+	+	
11. Garment buttoned completely	+	+	+	+	+	+	+	+	+	
12. Garment buttoned correctly	+	+	+	+	+	+	+	+	+	
13. Garment fastened	+	+	+	+	+	+	+	+	+	

A child from two to two and one-half learns to pull up his stocking, to keep the shoe opened, to put the foot in, heel down, to lace his shoe partly, and to put the shoe on the correct foot. For the torso and torso-leg garment, he learns to keep the garment on the right side and to get the first leg into a hole of the torso-leg garment.

A child of two and one-half to three should learn to start the stocking over the foot, to get the stocking up on the foot and to pull it up correctly. He learns to keep the leg garment "ready," and to get the second leg into the correct hole. He should put his arms and legs into the correct holes if it is a torso-leg garment, and keep a dress "ready," right side out and put the arms into holes.

A child of three to three and one-half learns to keep the tongue of a shoe out, to put his arms into the correct holes of a torso garment, and to adjust the garment. He keeps a leg garment front to front and adjusts it.

A child of three and one-half to four learns to adjust his stocking, to lace as much as he laces correctly, to keep a torso garment front to front. He buttons a leg garment correctly, if partially, and buttons a torso-leg garment completely. He gets his arms into the correct holes of a dress or petticoat, gets his head into the neck opening, keeps the garment front to front and adjusts it.

The child of four to four and one-half learns to partly button its dress and petticoat.

The child of five to five and one-half learns to lace his shoes completely.

The conclusions offered to summarize the above discussion are:

1. Ability to master a dressing unit and ability to master the same unit with 100 per cent success, are usually separated in time, and more widely separated for some units than for others. (Methods α and y , Table 6).

2. A child's ability to dress may be measured by the "dressing profile" in Table 7.

3. For children, the easiest units are putting arms and legs into a hole, some hole, pulling up garments, and keeping a garment placed more or less as given to them.

The more difficult units involve adjustment, which involves more mature coordination and better orientation in space than young children possess. Examples of such difficulties are getting the heel of the sock on the top of the foot and the inability to shift it correctly, in forcing heels into shoes, difficulty in getting arms and legs into the correct hole, and in keeping garments front to front. Tying, buttoning, and lacing are each and all difficult.

4. Learning to dress is a matter of learning a process at different levels. For example, putting on a shoe is not one act learned at a certain age; it is an act of many levels of learning. This is the most important point for the clinician, parent, and manufacturer to consider. One should not ask whether a child puts on his shoe, but rather what acts in putting on a shoe a child can accomplish.

VIII

TIME TAKEN TO DRESS

The amount of time in minutes a child takes to dress himself is considered in Table 8. This table indicates the following facts and conclusions:

1. There are wide individual differences in the amount of time required to dress. This is seen in the unreliability of the averages and the time range within a group.

2. Children between the ages of one and one-half to two and one-half years require a short time to dress; the teacher's assistance is considerable for this age. The children between three and one-half and five and one-half require the shortest time, probably, because of their greater average efficiency, and the children between two and one-half and three and one-half years require the longest time because they do not have as much help as the younger children, nor do they possess as much efficiency as the older children.

3. Although the means are not reliable, there is a tendency for the girls to dress faster than the boys.

4. Between the ages of one and one-half and two and one-half years, 15 to 25 minutes should be a time allowance for dressing; between two and one-half and four and one-half years, five to 45 minutes; and between four and one-half and five and one-half, five to 15 minutes.

5. The above wide variations in time to dress indicate the instability of the learning-to-dress process, and indicate that time is not as good a measure of ability to dress as the percentage of success.

TABLE 8

TIME

THE TIME IT TAKES A NURSERY SCHOOL CHILD TO DRESS

Mean, σ , quartiles, and range in minutes calculated from the records of 45 nursery-school children.

Method *a* at the rate of two observations a child a month for three months.

Method *b* at the rate of two observations only, a child within an age group.

Sections 1, 2, 3, 4, 5, 6

Age group	I	II	III	IV	V	VI	VII	VIII
Age range	18-23 mos.	24-29	30-35	36-41	42-47	48-53	54-59	60-65
No. of children	3	5	7	8	14	12	4	2
Section 1								
<i>a.</i>								
All observations								
No. of observations	14	18	38	32	60	46	22	12
Mean	15.07	14.28	16.79	17.59	10.63	12.24	10.46	8.12
σ	4.33	3.09	8.43	7.47	4.87	6.24	3.01	4.21
25 percentile	10	11	10	12	6.5	7	7	4.5
50 percentile	14	15	13	15	10	12	11.5	8.5
75 percentile	20	17	14	23.5	14	16	13	12.5
Range	6-24	9-20	6-35	8-40	2-23	3-33	6-15	3-17
Section 2								
<i>b.</i>								
Two observations per child								
No. of observations	6	10	14	16	28	24	8	4
No. of children	3	5	7	8	14	12	4	2
Mean	16	13.9	18	14.19	10.79	11.38	11	9
σ	4.47	3.51	5.41	6.07	4.87	3.94	3.	2.74
25 percentile	14	11	15	14.5	6.5	7	9	6.5
50 percentile	17	14	17	15	11	10	12	9.5
75 percentile	20	17	20	23.5	14.5	14.5	13	11.5
Range	8-20	9-20	6-27	9-40	2-23	3-18	6-14	5-12
Section 3								
<i>a.</i>								
Boys								
All observations on boys								
No. of boys	0	5	4	6	5	7	3	1
No. of observations	0	18	20	24	18	30	16	6
Mean		14.28	19.45	18.79	13.44	14.37	11.53	10.83
σ		3.09	5.33	7.16	4.95	4.68	2.73	4.06
25 percentile		11	14.5	13.5	10	11	9.5	8
50 percentile		15	19	15.5	13	14	12	11.5
75 percentile		17	17	24	17	17	13.5	13
Range		9-20	13-35	9-40	6-23	7-38	6-15	4-17

TABLE 8 (Continued)

Age group	I	II	III	IV	V	VI	VII	VIII
Age range	18-23 mos.	24-29	30-35	36-41	42-47	48-53	54-59	60-65
No. of children	3	5	7	8	14	12	4	2
Section 4								
<i>a.</i>								
Girls								
All observations on girls								
No. of girls	3	0	3	2	9	5	1	1
No. of observations	14	0	18	8	42	16	6	6
Mean	15.07		13.44	13.88	9.41	7.25	8.17	7.00
σ	4.83		5.13	3.55	4.30	3.13	2.19	2.94
25 percentile	10		10	8.5	5	6.5	6	4
50 percentile	14		13	9.5	9	9	7.5	6.5
75 percentile	20		15	17.5	12	13	10	9
Range	6-24		6-35	8-32	2-20	3-14	6-12	3-13
Section 5								
<i>a.</i>								
Shortest of two monthly observations per child								
No. of children	3	5	7	8	14	12	4	2
No. of observations	7	9	19	16	30	23	11	6
Mean	10.43	12.56	13.69	14.62	9.50	10.22	8.82	6.67
σ	2.25	2.67	4.39	5.18	4.54	4.36	2.87	2.87
25 percentile	8	11	10	10	5	6	6	4
50 percentile	10	11	14	13.5	8	10	7	6.5
75 percentile	14	15	16	19.5	11	13	12	9
Range	6-14	9-17	6-24	8-24	2-20	3-18	6-13	3-11
Section 6								
<i>a.</i>								
Longest of two monthly observations per child								
No. of children	3	5	7	8	14	12	4	2
No. of observations	7	9	19	16	30	23	11	6
Mean	19.29	16.	19.16	21.19	12.63	14.13	12.09	12.00
σ	2.86	2.45	5.88	8.49	4.53	7.21	2.06	4.08
25 percentile	17	15	14	14.5	9	9	10	8
50 percentile	20	15	18	23.5	11.5	12	12	12.5
75 percentile	20	18	15	25	16	18	14	13
Range	14-24	11-20	10-35	9-40	5-23	3-38	8-15	4-17

IX

VERBAL HELPS GIVEN IN DRESSING

The nature of the verbal helps is explained in the scoring method, page 82. The verbal help is a verbal suggestion to encourage or urge a child to dress; the verbal help does not instruct, nor does it serve as a substitution for a manual help. The child who is given a verbal help is just sitting, watching, talking, resting, discouraged, refusing, or expecting manual help although it appears to the teacher that the child could continue dressing. It was difficult for the teacher to be accurate in counting the helps so that statistical refinements and positive conclusions will not be given. The tendencies found in regard to verbal helps are seen in Table 9.

TABLE 9
THE NUMBER OF VERBAL HELPS GIVEN THE NURSERY SCHOOL CHILD DURING THE DRESSING PERIODS

The average number of helps given to the children in each age group. The range and quartiles.

Groups	I	II	III	IV	V	VI	VII	VIII
Age in months	18-23	24-29	30-35	36-41	42-47	48-53	54-59	60-65
No. of children	3	5	7	8	14	12	4	2
No. of observations for two observations per month for each child	14	18	38	32	60	46	22	12
Average no. of helps	8.07	6.17	7.95	7.75	3.58	5.24	2.09	3.50
25 percentile	4	5	2	3	1	1	0	1
50 percentile	7	65	6	5	3	4	2	3.5
75 percentile	13	8	12	10.5	5	8	3	5.5
Range	2-15	0-12	0-29	1-26	0-15	0-19	0-7	0-9

1. There are wide variations within an age group in the number of verbal helps given to children. A child of two or two and one-half may receive no verbal

help or as many as 29 such helps. This variation tends to decrease with age so that at five years, nine was the greatest number of verbal helps received.

2. The average number of verbal helps required tends to decrease with age. The average number decreases from eight at one and one-half, to four at five and one-half years, or about one half.

3. The fewer helps in the youngest and oldest age groups is probably to be explained by the teacher's manual help in the youngest groups and by the almost perfect ability of the oldest children to dress themselves (Tables 2 and 8).

4. The average and range of verbal helps per garment were as follows:

	Stockings (pairs)	Shoes (pairs)	Torso	Leg	Torso- leg	Dress and petticoat
Average	2	3	1	1	2	1
Range	0-11	0-9	0-5	0-8	0-9	0-4

5. The child varies from day to day in his need for verbal help. When a percentile rank was assigned to each of the 242 observations on the 45 children, for the amount of verbal help given at each observation, it was found that only two children, or 5 per cent ranked in the same quartile throughout their observations for the amount of verbal help they received; eight children, or 18 per cent, appeared in two adjacent quartiles; 20 children, or 44 per cent, appeared in three adjacent quartiles; and 15 children, or 33 per cent appeared in all four quartiles for amount of verbal help received.

In short, as individuals and as groups, children of

two and two and one-half years require more verbal help than older children. Also a child varies greatly in his need of verbal help; only 5 per cent of the children required about the same amount of verbal help from day to day.

X

GARMENTS WORN AND STYLES PREFERRED

Since dressing units represent the skills that must be mastered before dressing is accomplished, any increase in the number of units to be mastered or inclusion of the more difficult units in the dressing process would condition the ability to dress. For this reason a study of the number of garments worn and of styles seemed advisable. What do parents buy and manufacturers sell? Is their choice well made?

The number of garments worn could be indicated approximately by the number of dressing units in a child's clothing. Table 10 presents the data; it shows that the average number of units in children's clothing is fairly constant from one age group to the next, approximately 60 to 70 units per group, but the range is wide within each age group. Some children must master approximately 20 to 40 more difficulties than other children.

The popularity of a garment and the popularity of a given style is indicated by the number of cases wearing a garment, the number of such garments worn, and the proportions of the several styles. Facts on ability to dress noted in foregoing sections, as well as in Table 12, would be a basis of criticism for this popularity.

Tables 11 and 12 present the data on the popularity of the several garments worn and their styles.⁴

⁴The few cases, the use of percentage, the division of cases into boys and girls, makes it advisable to check conclusions from the several tabulations, and to use round numbers.

TABLE 10
AMOUNT OF CLOTHING WORN
NUMBER OF GARMENT UNITS IN CLOTHING WORN BY THE AVERAGE NURSERY
SCHOOL CHILD

Section 1: Calculations from two observations a child per month for three months on all 45 children.

Section 2: Calculations from two observations a child within an age group—(cf. p. 86).

Section 3 & 4: Calculations from two observations a child per month for three months on all boys and on all girls

Age group Age range, in mos.	I 18-23	II 24-29	III 30-35	IV 36-41	V 42-47	VI 48-53	VII 54-59	VIII 60-65
Section 1								
No. of children	3	5	7	8	14	12	4	2
No. of observations	14	18	38	32	60	46	22	12
Mean	76.43	63.	63.95	64.	63.52	61.23	67.09	63.75
P.E. _{mean}	1.23	.69	1.02	1.09	.74	.67	1.11	.93
σ	6.84	4.36	9.34	0.03	8.53	6.78	7.74	4.80
P.E. _{σ}	.87	.49	.72	.76	.53	.48	.79	.66
25 percentile	71	61	56	58	58	56	63	64.5
50 percentile	72	63	62.5	62	63	62	65	69
75 percentile	82	66	69	66	68	68	74	73.5
Range	67-91	53-71	49-90	49-92	39-88	52-83	51-83	61-76
Section 2								
No. of children	3	5	7	8	14	12	4	2
No. of observations	6	10	14	16	28	24	8	4
Mean	78.83	61.7	64.14	66.88	64.46	64.46	69.75	73.25
σ	7.85	4.65	11.54	10.04	10.41	7.40	9.65	4.92
25 percentile	71	59	56	61.5	58	56	62	65.5
50 percentile	78.5	62.5	61.5	63	63.5	62	69	70.5
75 percentile	85	63	72	68.5	69.5	69	78	75
Range	69-91	53-71	49-90	57-92	39-88	52-76	57-83	64-76
Section 3								
Boys								
No. of boys	0	5	4	6	5	7	3	1
No. of observations		18	20	24	18	30	16	6
Mean		63.	61.7	63.46	58.11	61.57	69.38	65.33
σ		4.36	7.92	5.62	6.04	5.98	7.25	8.38
25 percentile		61	56	61	56	56	63.5	63
50 percentile		63	62	63	59	61	66	65
75 percentile		66	67.5	66	63	62	76	67
Range		53-71	51-72	49-77	39-65	54-76	61-83	61-71
Section 4								
Girls								
No. of girls	3	0	3	2	9	5	1	1
No. of observations	14		18	8	42	16	6	6
Mean	76.43		66.44	65.33	65.83	65.45	61.	72.17
σ	6.84		11.65	15.14	8.39	8.02	5.32	8.85
25 percentile	71		53	56	59	60	57	71
50 percentile	72		66	56.5	65.5	66.5	63.5	73.5
75 percentile	82		76	75	70	70	64.5	74
Range	67-91		49-90	56-92	49-88	52-83	51-66	65-76

TABLE 11
AMOUNT AND STYLES OF CLOTHING

Number of children per age group, number of cases observed, number of cases wearing and not wearing and never wearing garment. Number of garments worn, and number of separate styles worn. These amounts are also presented in percentages, e.g., the percentage that the cases wearing and not wearing are of cases observed. Percentage of children never wearing are of children observed. Percentage of cases wearing 1, 2, and 3 garments, is of cases wearing the garments of that particular type. Percentage each style worn is of total number of garments worn.

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Stockings</i>								
All children								
No. children	3	5	7	8	14	12	4	2
No. cases (child) observ.	14	13	38	32	60	46	22	12
No. cases wearing	14	18	100	52	100	46	100	100
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments (prs.)	14	18	38	32	60	46	22	12
Styles								
A ¹	12	86	18	100	32	84	14	44
A ²	0	0	0	0	1	3	14	44
A ³	2	14	0	0	5	13	4	12
Two observ. per child								
No. children	3	5	7	8	14	12	4	2
No. cases observ.	6	10	14	16	28	24	8	4
No. cases wearing	6	100	14	100	100	100	100	100
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments (prs.)	6	10	14	16	28	24	8	4
Styles								
A ¹	4	67	10	100	12	86	8	33
A ²	0	0	0	0	6	38	13	34
A ³	2	33	0	0	2	14	3	13
					3	10	3	37
								0
								0
								25
								3
								75
								0
								0

TABLE 11 (continued)

Group CA, mos.	I 13-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Stockings (cont.)</i>								
<i>Boys</i>								
No. boys	0	5	4	6	5	7	3	1
No. cases observ.	0	18	20	24	18	30	16	6
No. cases wearing		18	100	24	100	30	100	6
No. cases not wearing		0	0	0	0	0	0	0
No. garments (prs.)		18	20	24	18	30	16	6
<i>Styles</i>								
A ¹	18	100	19	8	7	23	4	0
A ²	0	0	1	13	11	21	6	0
A ³	0	0	0	3	0	2	6	0
<i>Girls</i>								
No. girls	3	0	3	2	9	5	1	1
No. cases observ.	14	0	18	8	42	16	6	6
No. cases wearing	14	100	18	100	42	100	6	100
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments (prs.)	14		18	8	42	16	6	6
<i>Styles</i>								
A ¹	12	86	13	6	27	64	6	2
A ²	0	0	0	1	10	24	0	3
A ³	2	14	5	1	5	12	0	1

TABLE 11 (continued)

Group	I	II	III	IV	V	VI	VII	VIII
CA, mos.	18-23 %	24-29 %	30-35 %	36-41 %	42-47 %	48-53 %	54-59 %	60-65 %
<i>Shoes</i>								
All children								
No. children	5	5	7	8	14	12	4	2
No. cases observ.	14	18	38	32	60	46	22	12
No. cases wearing	14	100	38	100	60	100	22	100
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments (prs.)	14	18	38	32	60	46	22	12
<i>Styles</i>								
B ¹	14	14	17	45	25	42	2	9
B ²	0	4	22	14	25	42	16	73
B ³	0	0	0	0	8	13	0	0
B ⁴	0	0	0	0	2	3	4	18
<i>Two observ. per child</i>								
No. children	3	5	7	8	14	12	4	2
No. cases observ.	6	10	14	16	28	24	8	4
No. cases wearing	6	100	14	100	28	100	8	100
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments (prs.)	6	10	14	16	28	24	8	4
<i>Styles</i>								
B ¹	6	60	6	45	11	39	8	34
B ²	0	4	40	6	37	14	50	13
B ³	0	0	0	0	3	11	1	4
B ⁴	0	0	0	0	0	0	0	0

TABLE 11 (continued)

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Shoes (cont.)</i>								
Boys								
No. boys	0	5	4	6	5	7	3	1
No. cases observ.	0	18	20	24	18	30	16	6
No. cases wearing		18	20	24	18	30	16	6
No. cases not wearing		0	0	0	0	0	0	0
No. garments (prs.)		18	20	24	18	30	16	6
Styles								
B ¹	14	78	11	16	10	12	2	3
B ²	4	22	9	3	8	18	10	3
B ³	0	0	0	0	0	0	0	0
B ⁴	0	0	0	0	0	0	4	0
Girls								
No. girls	3	0	3	2	9	5	1	1
No. cases observ.	14	0	18	8	42	16	6	6
No. cases wearing	14	100	18	8	42	16	6	6
No. cases not wearing	0	0	0	0	0	0	0	0
No. garments	14		18	8	42	16	6	6
Styles								
B ¹	14	100	6	2	18	4	0	0
B ²	0	0	12	6	14	33	6	5
B ³	0	0	0	0	8	19	1	1
B ⁴	0	0	0	0	2	5	2	0

TABLE 11 (continued)

Group	I	II	III	IV	V	VI	VII	VIII
CA, mos.	18-23 %	24-29 %	30-35 %	36-41 %	42-47 %	48-53 %	54-59 %	60-65 %
<i>Torio</i>								
All children								
No. children	3	5	7	8	14	12	4	2
No. cases observ.	14	18	38	32	60	46	22	12
No. cases wearing	14	12	18	18	20	14	17	11
No. cases not wearing	0	6	20	14	40	32	5	8
No. children never wearing	0	0	4	3	7	7	0	0
Cases wearing 1	12	11	9	15	17	10	11	11
2	2	1	9	3	3	4	5	0
3	0	0	0	0	0	0	1	0
No. garments	16	13	27	21	23	18	24	11
<i>Styles</i>								
C ¹	12	3	18	1	6	2	3	7
C ²	2	0	0	2	2	5	13	0
C ³	0	6	0	0	0	0	0	0
C ⁴	2	0	1	0	6	3	3	0
C ⁵	0	0	2	0	1	1	0	0
C ⁶	0	4	5	18	7	6	4	4
C ⁷	0	0	0	0	1	1	1	0
Two observ. per child								
No. children	3	5	7	8	14	12	4	2
No. cases	6	10	14	16	28	24	8	4
No. cases wearing	6	6	6	10	11	9	7	8
No. cases not wearing	0	4	8	6	17	15	1	0
No. children never wearing	0	0	4	3	7	7	0	0
Cases wearing 1	4	5	2	8	8	6	3	4
2	2	1	4	2	3	3	3	0
3	0	0	0	0	0	0	1	0

TABLE 11 (continued)

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Torso (cont.)</i>								
No. garments	8	7	10	12	14	12	12	4
Styles								
C ^a	4	3	6	0	2	2	1	2
C ^b	2	0	0	2	2	4	5	8
C ^c	0	2	0	0	0	0	0	42
C ^d	2	0	1	0	5	1	2	0
C ^e	0	0	1	0	1	1	0	17
C ^f	0	0	1	0	1	1	0	0
C ^g	0	2	2	10	3	3	4	53
C ^h	0	0	0	0	1	1	0	0
Boys								
No. boys	0	5	4	6	5	7	3	1
No. cases	0	18	20	24	18	30	16	6
No. cases wearing	0	12	6	16	8	9	16	5
No. cases not wearing		6	14	8	10	21	0	83
No. children never wearing		1	3	2	2	4	0	1
Cases wearing 1		11	0	15	7	6	10	0
2		1	6	1	1	3	5	5
3		0	0	0	0	0	1	6

TABLE 11 (continued)

Group	I	II	III	IV	V	VI	VII	VIII
CA, mos.	18-23 %	24-29 %	30-35 %	36-41 %	42-47 %	48-53 %	54-59 %	60-65 %
<i>Torso (cont.)</i>								
No. garments		13	12	17	9	12	23	5
Styles								
C ^a	3	23	6	50	1	6	0	0
C ^b	0	0	0	0	0	0	3	13
C ^c	6	46	0	0	0	4	13	57
C ^d	0	0	0	0	0	0	0	0
C ^e	0	0	0	0	0	1	3	13
C ^f	0	0	0	0	1	1	0	0
C ^g	4	31	6	50	7	42	3	13
C ^h	0	0	0	0	1	1	1	4
<i>Girls</i>								
No. girls	3	0	3	2	9	5	1	1
No. cases	14	0	18	8	42	16	6	6
No. cases wearing	14	100	12	67	12	29	1	17
No. not wearing	0	0	6	33	30	71	5	83
No. children never wearing	0	0	1	33	5	55	3	60
No. cases wearing 1	12	86	9	67	0	83	4	80
2	2	14	3	33	2	17	1	20
3	0	0	0	0	0	0	0	0
No. garments	16	0	15	4	14	6	1	6
Styles								
C ^a	12	75	12	80	0	0	0	0
C ^b	2	12	0	0	6	43	2	33
C ^c	0	0	0	2	2	14	1	17
C ^d	2	12	1	7	0	0	0	0
C ^e	0	0	2	13	0	43	2	33
C ^f	0	0	0	0	0	0	0	0
C ^g	0	0	0	2	0	0	1	17
C ^h	0	0	0	0	0	0	0	0

TABLE 11 (continued)

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Leg garments</i>								
<i>All children</i>								
No. children	3	5	7	8	14	12	4	2
No. cases	14	18	38	32	60	46	22	12
No. cases wearing	14	12	18	13	42	25	10	11
No. cases not wearing	0	6	20	19	18	21	12	1
No. children never wearing	0	0	4	5	4	4	0	0
Cases wearing 1	5	11	4	17	42	22	10	11
2	9	8	14	1	0	3	0	0
3	0	0	0	0	0	0	0	0
No. garments	23	13	32	19	42	28	10	11
Styles								
D ¹	12	8	18	56	2	8	4	0
D ²	4	1	8	0	4	2	2	0
D ³	7	2	12	10	31	15	2	2
D ⁴	0	2	2	6	5	3	2	4
Two observ. per child								
No. children	3	5	7	8	14	12	4	2
No. cases	6	10	14	16	28	24	8	4
No. cases wearing	6	6	43	10	19	16	6	4
No. cases not wearing	0	4	8	6	9	8	2	0
No. children never wearing	0	0	4	3	4	4	0	0
No. cases wearing 1	1	5	1	10	19	14	6	4
2	5	83	5	83	0	2	0	0
3	0	0	0	0	0	0	0	0
No. garments	11	7	11	10	19	18	6	4
Styles								
D ¹	4	4	57	5	1	6	4	0
D ²	4	1	14	0	5	1	0	1
D ³	3	2	29	4	12	8	1	25
D ⁴	0	0	0	6	3	5	1	1

TABLE 11 (continued)

Group	I	II	III	IV	V	VI	VII	VIII
CA, mos.	18-23 %	24-29 %	30-35 %	36-41 %	42-47 %	48-53 %	54-59 %	60-65 %
<i>Leg garments (cont.)</i>								
Boys								
No. boys	0	5	4	6	5	7	3	1
No. cases	0	18	20	24	18	50	16	6
No. cases wearing		12	6	16	8	9	9	5
No. cases not wearing		6	33	8	45	30	56	83
No. children never wearing		0	14	70	10	21	7	1
No. cases wearing 1		0	3	75	2	40	0	0
2		11	92	0	8	57	9	0
3		1	6	15	100	8	100	5
No. cases wearing 1		8	6	1	0	1	0	0
2		0	0	6	0	11	0	0
3		0	0	0	0	0	0	0
No. garments		13	12	17	8	10	9	5
Styles								
D ¹		8	6	50	0	5	4	0
D ²		1	0	0	0	0	2	0
D ³		2	6	10	7	3	2	4
D ⁴		2	0	6	1	2	1	1
Girls								
No. girls	3		3	2	9	5	1	1
No. cases	14	18	12	8	42	16	6	6
No. cases wearing	100	12	67	2	34	16	1	6
No. cases not wearing	0	6	33	6	8	0	5	0
No. children never wearing	0	1	4	1	1	0	0	0
No. cases wearing 1	5	36	1	25	34	100	1	100
2	9	64	8	2	0	14	0	6
3	0	0	75	0	0	88	0	100
No. garments	23	20	0	0	34	12	0	0
Styles								
D ¹	12	52	12	0	2	3	0	0
D ²	4	17	0	0	4	12	0	2
D ³	7	31	6	0	24	70	1	33
D ⁴	0	0	2	2	4	12	0	0
			10	100	4	5	0	4

TABLE 11 (continued)

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Torso-leg garments</i>								
All children								
No. children	3	5	7	8	14	12	4	2
No. cases	14	18	38	32	60	46	22	12
No. cases wearing	0	17	20	31	55	40	21	12
No. cases not wearing	14	1	18	1	5	6	1	12
No. children never wearing	3	0	3	0	1	1	0	0
No. cases wearing 1	0	11	6	17	44	19	15	11
No. cases wearing 2	0	6	14	14	11	20	6	8
3	0	0	0	0	0	0	0	0
No. garments	0	23	34	45	65	61	27	13
Styles								
E ¹	0	9	20	26	42	33	15	6
E ²	0	0	0	5	0	0	0	0
E ³	0	0	0	11	0	0	0	0
E ⁴	0	14	14	14	14	4	0	5
E ⁵	0	0	0	31	10	24	12	39
Two observ. per child								
No. children	3	5	7	8	14	12	4	2
No. cases	6	10	14	16	28	24	8	4
No. cases wearing	0	9	8	16	25	19	7	4
No. cases not wearing	6	1	6	0	3	5	1	0
No. children never wearing	3	0	3	0	1	1	0	0
No. cases wearing 1	0	5	2	10	19	11	7	4
No. cases wearing 2	0	4	6	6	6	8	0	0
3	0	0	0	0	0	0	0	0
No. garments	0	13	14	22	31	27	7	4
Styles								
E ¹	0	5	8	14	19	13	4	2
E ²	0	0	0	0	0	0	0	0
E ³	0	0	0	2	5	4	0	0
E ⁴	0	8	6	6	6	10	3	0

TABLE 11 (continued)

Group CA, mos.	I 18-23 %	II 24-29 %	III 30-35 %	IV 36-41 %	V 42-47 %	VI 48-53 %	VII 54-59 %	VIII 60-65 %
<i>Torso-leg garments (cont.)</i>								
Boys								
No. boys	0	5	4	6	5	7	3	1
No. cases		18	20	24	18	30	16	6
No. cases wearing		17	14	23	18	28	15	6
No. cases not wearing		1	6	1	0	2	1	0
No. children never wearing		0	1	0	0	0	0	0
No. cases wearing 1		11	65	15	8	7	9	5
2		6	35	14	10	21	6	1
3		0	0	0	0	0	0	0
No. garments		23	28	31	28	49	21	7
Styles								
E ¹		9	14	18	10	23	8	6
E ²		0	0	0	0	0	0	0
E ³		0	0	5	8	2	0	0
E ⁴		14	14	8	10	24	13	1
Girls								
No. girls	3	0	3	2	9	5	1	1
No. cases	14	0	18	8	42	16	6	6
No. cases wearing	0	0	6	8	37	12	5	6
No. cases not wearing	0	0	12	0	5	4	0	0
No. children never wearing	0	100	2	0	1	1	0	0
No. cases wearing 1	0	0	67	0	11	20	0	0
2	0	0	67	0	36	12	6	6
3	0	0	100	2	97	100	100	100
No. garments		0	0	6	1	0	0	0
Styles								
E ¹	0	0	6	14	38	12	6	6
E ²	0	0	6	8	32	10	6	0
E ³	0	0	0	0	0	0	0	0
E ⁴	0	0	0	0	6	2	0	5
E ⁵	0	0	0	6	16	17	0	83
				57	0	0	0	1

TABLE 11 (continued)

Group	I	II	III	IV	V	VI	VII	VIII
CA, mos.	18-23	24-29	30-35	36-41	42-47	48-53	54-59	60-65
	%	%	%	%	%	%	%	%
<i>Dress and petticoat</i>								
All children								
No. children	3	5	7	8	14	12	4	2
No. cases	14	18	38	32	60	46	22	12
No. cases wearing	14	0	18	2	42	16	6	6
No. cases not wearing	0	0	20	30	18	30	16	6
No. children never wearing	0	5	4	7	5	7	3	1
No. cases wearing 1	8	0	10	55	39	16	6	6
2	6	0	8	0	3	0	0	0
3	0	0	0	0	0	0	0	0
No. garments	20	0	26	2	45	16	6	6
Styles								
F ¹	2	1	4	2	1	1	1	0
F ²	4	7	27	0	2	0	0	0
F ³	10	15	58	0	33	7	3	4
F ⁴	4	3	11	0	9	8	2	3
Two observ. per child								
No. children	3	7	8	8	14	12	4	2
No. cases	6	14	16	16	28	24	8	4
No. cases wearing	6	6	43	2	18	10	2	2
No. cases not wearing	0	8	57	14	16	14	6	2
No. children never wearing	0	4	57	7	5	7	3	1
No. cases wearing 1	4	4	67	2	17	10	2	2
2	2	2	53	0	1	0	0	0
3	0	0	0	0	0	0	0	0
No. garments	8	8	2	2	19	10	2	2
Styles								
F ¹	0	0	0	2	0	0	1	0
F ²	2	2	25	0	1	0	0	0
F ³	5	6	75	0	13	5	1	2
F ⁴	1	0	0	0	5	5	0	0

NOTE: Since a boy never wore a dress or petticoat, and all girls wore a dress or petticoat except one girl in Group IV, no separate calculations are made for boys and girls. Except for Group IV, as mentioned, the calculations made for "all children," and for "two observations per child" could be considered calculations for a separate section on girls.

TABLE 12.—COMPARATIVE DIFFICULTY OF THE VARIOUS STYLES OF GARMENTS

The % of success ————— for each garment and its styles in all the 242 observations on all the 45 children.
(successes) —————
(successes + failures)

	Style			Style			Style			Style			Style		
	All stockings	A ¹	A ²	A ³	All shoes	B ¹	B ²	B ³	B ⁴	All torso	C ¹	C ²	C ³	C ⁴	C ⁵
Garments															
Group I, 18-23 mos.															
No. children	3				3					3					
No. children wearing garment	3	2	0	1	3	3	0	0	0	3	2	1	0	1	0
No. garments worn	14	12	0	2	14	14	0	0	0	16	12	2	0	2	0
Mean % of success	48	41		89	26	26				31	31	20	30	30	0
Median % of success	47	47		89	37	37				33	33	21	31	31	0
σ	31.5				17.8					14.6					
Range	0-92	0-86		86-92	0-55	0-55				0-75	0-75	0-40		0-60	
Group II, 24-29 mos.															
No. children	5				5					5					
No. children wearing garment	5	5	0	0	5	3	2	0	0	5	2	0	1	0	0
No. garments worn	18	18	0	0	18	14	4	0	0	13	3	0	6	0	0
Mean % of success	68	68			54	55	50			32	24	25	25	33	33
Median % of success	77	77			60	60	50			33	33	22	22	31	31
σ	29.6				12.9					22.9					
Range	0-100	0-100			25-69	25-68	31-69			0-70	0-58	0-63		0-70	
Group III, 30-35 mos.															
No. children	7				7					7					
No. children wearing garment	7	7	1	1	7	4	6	0	0	5	3	0	0	1	1
No. garments worn	38	32	1	5	38	17	21	0	0	27	18	0	0	1	2
Mean % of success	82	80	71	94	54	54	54			60	70	55	55	55	52
Median % of success	86	71	92		59	59	63			77	77	55	55	55	50
σ	20.1				21.4					28.1					
Range	29-100	29-100	71-71	86-100	5-82	14-82	5-77			0-100	25-100	55-55	55-55	0-0	33-78
Group IV, 36-41 mos.															
No. children	8				8					8					
No. children wearing garment	8	4	5	2	8	5	3	0	0	5	1	1	0	0	5
No. garments worn	32	14	14	4	32	18	4	0	0	21	1	2	0	0	18
Mean % of success	86	87	81	86	71	74	67			81	67	100	100	80	80
Median % of success	92	89	86		75	75	69			67	67	100	100	89	89
σ	14.6				8.4					20.4					
Range	57-100	57-100	64-100	57-95	45-82	59-82	45-75			33-100	67-67	100-100			33-100

TABLE 12 (continued)

	Style					Style					Style						
	All leg	D ¹	D ²	D ³	D ⁴	All torso-leg	E ¹	E ²	E ³	E ⁴	E ⁵	All dress & petticoat	F ¹	F ²	F ³	F ⁴	F ⁵
Garments																	
Group I, 13-23 mos.																	
No. children	3					3						3					
No. children wearing garment	3	3	1	2	0	0						3	1	1	2	2	
No. garments worn	23	12	4	7	0	0	0	0	0	0	0	20	2	4	10	4	
Mean % of success	67	74	40	68								41	51	21	39	59	
Median % of success		75	41	67									52	25	42	64	
σ	18.6											22.2					
Range	30-100	38-100	30-50	44-88								0-89	40-63	0-33	0-80	20-89	
Group II, 24-29 mos.																	
No. children	5					5						5					
No. children wearing garment	5	2	1	2	1	5	3	0	0	5	0	0	0	0	0	0	
No. garments worn	13	8	1	2	2	23	9	0	0	14	0	0	0	0	0	0	
Mean % of success	68	82	0	81	33	35	37			33							
Median % of success		88	0	81	34		38			38							
σ	31.9					16.3											
Range	0-100	33-100	0-6	73-89	17-50	0-69	23-69			0-34							
Group III, 30-35 mos.																	
No. children	7					7						7					
No. children wearing garment	3	3	1	3	1	4	4	0	0	3	0	3	1	3	3	1	
No. garments worn	32	18	0	12	2	34	20	0	0	14	0	26	1	7	15	3	
Mean % of success	83	88		80	67	75	82			69		76	83	67	80	72	
Median % of success		88		78	67		87			66			88	70	89	70	
σ	16.5					19.9						15.6					
Range	56-100	57-100		56-100	64-70	38-100	54-100			38-100		33-90	83-88	33-86	38-92	56-90	
Group IV, 36-41 mos.																	
No. children	8					8						8					
No. children wearing garment	5	0	1	3	3	8	7	0	1	4	0	1	1	0	0	0	
No. garments worn	19	0	1	10	8	45	26	0	5	14	0	2	2	0	0	0	
Mean % of success	85		58	92	79	78	81		94	68		78	78				
Median % of success			58	100	75		100		90	77			78				
σ	14.5					26.0						22.0					
Range	58-100		58-58	56-100	70-92	55-100	54-100		38-100	0-100		56-100	56-100				

	All stockings				All shoes				All torso								
	A ¹	A ²	A ³		B ¹	B ²	B ³	B ⁴	C ¹	C ²	C ³	C ⁴	C ⁵	C ⁶	C ⁷		
Group V, 42-47 mos.																	
No. children	14				14				14								
No. children wearing garment	14	13	11	2	14	8	9	4	1	7	2	2	0	3	1	2	1
No. garments worn	60	34	21	5	60	25	25	8	2	23	6	2	0	6	1	7	1
Mean % of success	98	98	96	97	77	81	66	91	100	88	100	52		99	0	97	15
Median % of success		100	100	100		82	68	100	100		100	78		100	0	100	15
σ	7.5				15.2				24.3								
Range	50-100	83-100	50-100	92-100	25-100	50-91	25-86	49-100	100-100	0-100	100-100	75-82		91-100	0-0	100-100	15-15
Group VI, 48-53 mos.																	
No. children	12				12				12								
No. children wearing garment	12	7	10	3	12	6	8	1	1	5	1	3	0	2	1	3	1
No. garments worn	46	13	30	3	46	16	27	1	2	18	2	5	0	3	1	6	1
Mean % of success	98	98	97	100	72	77	66	100	100	89	100	85		92	64	96	67
Median % of success		100	100	100		77	69	100	100		100	100		100	64	100	67
σ	5.3				19.1				19.9								
Range	71-100	93-100	71-100	100-100	0-100	56-100	0-100	100-100	100-100	25-100	100-100	25-100		75-100	64-64	78-100	67-67
Group VII, 54-59 mos.																	
No. children	4				4				4								
No. children wearing garment	4	2	2	1	4	1	3	0	1	4	1	3	0	1	0	3	1
No. garments worn	22	10	6	6	22	2	16	0	4	24	3	13	0	3	0	4	1
Mean % of success	100	100	100	100	88	85	86		100	98	98	99		97		100	100
Median % of success		100	100	100		85	91		100		100	100		100		100	100
σ	0				11.7				5.8								
Range	100-100	100-100	100-100	100-100	68-100	77-92	68-100		100-100	75-100	88-100	92-100		94-100		100-100	100-100
Group VIII, 60-65 mos.																	
No. children	2				2				2								
No. children wearing garment	2	1	2	1	2	1	2	1	0	2	2	0	0	0	0	1	0
No. garments worn	12	2	9	1	12	3	8	1	0	11	7	0	0	0	0	4	0
Mean % of success	100	100	100	100	81	84	79	90		99	100					97	
Median % of success		100	100	100		83	82	90			100					100	
σ	0				7.7				3.2								
Range	100-100	100-100	100-100	100-100	63-90	82-86	63-88	90-90		89-100	100-100					89-100	

TABLE 12 (continued)

	All leg	Style			All torso-leg	Style			All dress & peticoat			Style				
		D ¹	D ²	D ³		E ¹	E ²	E ³	E ⁴	E ⁵	F ¹	F ²	F ³	F ⁴	F ⁵	
Group V, 42-47 mos.																
No. children	14				14							14				
No. children wearing garment	10	2	4	9	4	13	10	0	4	4	0	9	1	1	9	6
No. garments worn	42	2	4	31	5	66	42	0	14	10	0	45	1	2	33	9
Mean % of success	98	100	98	99	88	97	99		99	84		91	100	90	91	84
Median % of success		100	100	100	100		100		100	89		8	100	90	96	89
σ	9.2					7										
Range	42-100	100-100	92-100	89-100	42-100	71-100	92-100		82-100	71-92		75-100	100-100	90-90	75-100	75-100
Group VI, 48-53 mos.																
No. children	12				12							12				
No. children wearing garment	8	4	1	5	2	11	8	0	2	6	0	5	1	0	5	5
No. garments worn	28	8	2	15	3	61	33	0	4	24	0	16	1	0	7	8
Mean % of success	96	100	96	99	74	95	98		100	91		89	100		88	89
Median % of success		100	96	100	64		100		100	92			100		89	90
σ	9.9					8.9						6.3				
Range	58-100	100-100	92-100	89-100	58-100	0-100	38-100		100-100	0-100		75-100	100-100		75-91	75-100
Group VII, 54-59 mos.																
No. children	4				4							4				
No. children wearing garment	4	1	1	2	2	4	3	0	0	3	0	1	1	0	1	1
No. garments worn	10	4	2	2	2	27	15	0	0	12	0	6	1	0	3	2
Mean % of success	99	97	100	100	100	99	99			99		98	100		100	95
Median % of success		100	100	100	100		100						100		100	95
σ	3.0					5.4						3.7				
Range	89-100	89-100	100-100	100-100	100-100	85-100	85-100		92-100	0-100		90-100	100-100		100-100	90-100
Group VIII, 60-65 mos.																
No. children	2				2							2				
No. children wearing garment	2	0	1	1	2	2	1	0	1	2	0	1	0	0	1	1
No. garments worn	11	0	2	5	4	13	6	0	5	2	0	6	0	0	4	2
Mean % of success	100	100	100	100	100	97	100		96	90		97			100	90
Median % of success		100	100	100	100		100		100	100					100	90
σ	0					6.1						4.7			100-100	90-90
Range	100-100	100-100	100-100	100-100	100-100	79-100	100-100		91-100	79-100		90-100			100-100	90-90

1. All children wore stockings or socks. A^1 , the short sock, was the most popular up to the age of three; 80 to 100 per cent of the cases wore them. This percentage drops to between 40 and 50 per cent between the ages three and four and one-half years. A^2 , the long sock, is worn by 25 to 75 per cent of the cases from three and one-half to five and one-half years. A^3 , the long stocking, is worn by about 10 per cent regardless of age. Girls tend to wear more short socks and long stockings. Although the short sock is more popular, it is little if any easier to manage than the longer stocking. Apparently the main difficulty of any stocking is the foot part.

2. All children wore shoes. B^1 , the high lace shoe, tends to be the popular one up to three and one-half years, B^2 , the low lace shoe, increases in popularity from two years on. B^3 , slippers, and B^4 , sandals, are worn from three and one-half years up, but never form more than 15 per cent of the footwear. Boys increase the number of high lace shoes worn, and no boys wore buttoned or buckled slippers. Here the most popular style, the laced shoe, is the most difficult for the child to put on—if we rely on calculation for Group V and up, as a basis of comparison and also use the results of Table 6.

3. Torso garments are popular at the earliest ages and latest ages; they are worn by about 50 per cent of the cases in the middle group, but rather a large percentage of the children in these middle groups never wear them. About 30 per cent of the children wearing torso garments wear two such garments. There

are seven styles of torso garments. There are indications that the older children wear a greater variety of these seven styles. The suspender, buttoned and tie styles, $C^3, ^5, ^7$ are either not worn or have low success scores. The slip-over styles, C^1 and C^0 , have high popularity and comparatively high success scores. The body underwaist and buttoned shirt, C^2 and C^4 , are worn more constantly by the older groups. Girls tend to wear fewer torso garments, many fewer outer suit waists. The popularity of this garment for the youngest children seems well founded. And it is also best for self-help that the more difficult of the numerous styles are kept for the older children.

4. The leg garment is slightly more popular on the whole than the torso garment, and not so popular as the torso-leg garment. All children wear leg garments that are not attached to waists from one and one-half to two years, and about 50 per cent of the cases wore them through the middle age groups; few children are without them. Preference for style is rather evenly distributed. D^1 and D^3 , the under and outer garments with elastic at the waist, are preferred but not in direct proportion to their ease of putting on; up to three and one-half years they are easier by about $1/3$ to $1/2$ (Table 12). Boys wear the garment more constantly and regularly than girls. From the standpoint of self-help, the styles of this garment could be even more limited to D^1 and D^3 , the types with elastic, for the younger child.

5. The torso-leg garment is the most popular body garment from two years up. There are few children

who never wear it. Twenty-five per cent or more of the cases wear two such garments. The most popular styles are E¹ and E⁴, the one piece buttoned in front. E⁶, the outer suit buttoned in back, was never worn, and the undersuit buttoned in back or with no fastening is seldom worn. Girls more seldom wear two such garments, probably because the dress and petticoat are substitutes. In this garment the basis of the popularity seems parallel to the ease of putting it on, except that the garment with no fastening deserves more consideration, at least more study, because fastenings are a difficult unit always.

6. As may be expected, only the girls wore dresses and petticoats. The style variation here is a matter of the presence and placement of fastenings. Front fastenings or no fastenings are easier on the whole, and no fastening on petticoats is preferred with increasing age; it is also less difficult.

CONCLUSIONS

1. Some children wear more clothing units in their garments than is necessary for the comfort and self-help of the average child.

2. Popularity of the short sock, laced shoe, and fastened rather than slip-on styles is not well justified by the measurement of difficulty.

3. Popularity of the slip-over torso, the elastic-held leg garment and front fastening versus tie and back fastening on torso-leg garments and dresses is justified by measures of difficulty.

4. The number of styles tends to increase with age

in most clothing, and particularly so in stockings, in shoes, and in torso garments (with the exception of Group 7 and 8). The distribution of styles according to age, however, is mixed in torso-leg garments and more evenly distributed in leg garments. From the standpoint of self-help, the age of a child should more fully determine the number of styles worn. The younger child should have fewer and easier ones.

5. The obvious choice of clothing on the basis of sex is apparent in dresses and petticoats for girls, in more leg garments for boys, and in the fact that no boy wore buttoned slippers.

XI

INTEREST

Interest in dressing oneself is, no doubt, an important factor in learning to dress. A scale of interest was included in the present study, but a difference in the teachers' criteria invalidated the ratings. However, the child's remarks and notes on his behavior while dressing were recorded in a good many cases, especially in the younger groups, "first for the purpose of illustrating the child's interest in the task; and secondly to find the relation between verbal control (of the task) and skill in dressing." (M.P.H.) These notations were listed in chronological order and subsumed under headings such as comment on difficulties, "clothes-consciousness," shifting attention, demand for approval, confidence in ability, various degrees of cooperation, orientation, social distractions. The analysis follows, and after the analysis will be found the notations themselves of the children's remarks and behavior.

ANALYSIS

1. Between one and one-half and two years, or from 20 to 30 months, remarks and behavior indicate frequency of passive and indifferent cooperation. There are cases of marked effort and active interest. Difficulties are: failures to discriminate correct holes and difficulty with sock and buttons. There is a beginning of emotional disturbance and autocriticism.

2. Between two and one-half to almost three and

one-half years, or from 30 to 40 months, the notes indicate the "storm and stress" period of learning to dress. There are a number of emotional disturbances, lack of interest, "I can't's" and refusals. There are also instances of exclamations of satisfaction and removals of a garment to correct errors. Adjustment is a difficulty. Orientation is giving trouble. "Clothes consciousness" is shown in the mention of new, soiled, best and party clothes. Approval is asked when success is gained. Self-criticism and verbal control of the work is evident.

3. Between three and one-half to four and one-half years, or from 40 to 50 months, the dressing is giving the child more satisfaction and freedom. There is a good deal of talking and social intercourse, orientation is recognized as wrong or right and corrected by noting details. Removal of a garment for correction continues. Buttons and bow knots are difficulties; the children ask for specific help; some still say "I can't." There are pleasant surprises at hoped-for but unexpected successes; confidence and pride is expressed in the ability to dress oneself. Ingenuity in meeting a dressing problem is mentioned and swearing at an unruly sock occurred at five years.

In conclusion, this analysis would indicate the need for considerable help in dressing for the child between 20 and 30 months; considerable guidance, patience, and encouragement between 30 and 40 months; and more and more satisfaction, skill and expected independence between 40 and 50 months. These indications would agree with the more quantitative findings in Table 2.

Case No.	Interest	Observation order
1. 19 mos. J. F.	3/31/32	1
	Random cross movement as if lacing shoes.	
1. 20 mos. J. F.	4/26/32	2
	"Shirt on."	
3. 23 mos. J. McP.	4/12/32	3
	Apathetic; willing to be dressed.	
3. 23 mos. J. McP.	4/14/32	3
	Had to hand things to her. Put feet in neck.	
x. 23 mos. M. A. K.	5/21/34	3½
	No effort, no attention to small details.	
4. 26 mos. J. B.	4/4/32	4
	Sleepy and indifferent.	
5. 27 mos. J. E.	4/19/32	5
	No initiative shown in putting on garments, but very cooperative (e.g., if suit held, would put arm in).	
6. 29 mos. M. K.	4/7/32	6
	Looked in garments for holes for legs; put arms through leg holes.	
8. 29 mos. G. B.	2/18/32	7
	George R.—"You put 'em on. You put 'em on. This the wrong hole. This in the hole. I don't know how to get my clos on, clos on. Push, push (button). I put my finger in dere. Button fru 'is hole. Button fru 'is hole. Put iss on (sweater). Iss all right. Put at on."	
	Effort very good. Whimpered at his lack of success. Almost stuttered. "Put, put, put iss on" etc.	
8. 30 mos. G. B.	3/25/32	8
	"Button me. Put my sock on Mrs. Pyles. I too little. This on" (sock).	
8. 31 mos. G. B.	4/13/32	9
	"Pull this around too" (sock).	
10. 31 mos. E. O.	2/15/32	10
	"I have new dresses at home. Those shoes	

are weared a long time. Foot, don't go in there. These are very dirty tockins, aren't they? Too tight (shoe). Unlace it."

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|-----|---------|---|---------|----|
| 11. | 31 mos. | B. P. | 2/15/32 | 11 |
| | | <p>"There's a doggie up there. There's a pygin up there." Kept looking at me and all around the room. "Pig coming down the hill" (picture on wall). Began putting on sweater before shirt was on and shoes and pants before sweater was on (i.e., was half on). "Put my arm in there." Sat with 2 feet in one leg of pants; sweater around neck and fiddled with his socks and shoes. Fiddled continually then would look self-consciously at the recorder. Looked up to the recorder for approval when act was successful. Fiddled with mat between putting on the two socks. Said, "See that" when he put on second sock successfully. Fiddled aimlessly with shoe laces.</p> | | |
| 12. | 31 mos. | A. S. | 2/9/32 | 12 |
| | | <p>Removed shoes to see if heels were right. "I take it off and put it on again."</p> | | |
| 13. | 32 mos. | D. G. | 2/18/32 | 13 |
| | | <p>"Other one too." Irritable; almost whimpered, sock on one.</p> | | |
| 10. | 32 mos. | E. O. | 3/21/32 | 14 |
| | | <p>"Here's a heel; pull the heel 'round, will you Miss Pyles? It won't come 'round. I can't. Why do they get heels in my stockings for; they musn't do that, must they? I can't tie a bow, can I Miss Pyles?" Whined, almost cried at a difficulty. Real interest shown in putting on pink silk party pants but not in putting on shirt and underpants.</p> | | |

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|-----|---------|---|---------|------|
| 11. | 32 mos. | B. P. | 3/17/32 | 15 |
| | | Unwilling performance; whined, "I can't." | | |
| 11. | 32 mos. | B. P. | 3/18/32 | 15 |
| | | Tried shoes and stockings 2 on 1 foot; corrects his mistake. Cries, knows wrong but doesn't do anything about it. | | |
| 12. | 32 mos. | A. S. | 3/24/32 | 16 |
| | | Took off and fixed second sock so heel wouldn't need adjustment. | | |
| 12. | 32 mos. | A. S. | 3/31/32 | 16 |
| | | "I have to take it off and turn it around and put it back on again" (sock). | | |
| 13. | 32 mos. | D. G. | 3/23/32 | 18 |
| | | "Where arm?" Good verbal control of the situation: i.e., said, "unlace it" (when unlacing shoe). | | |
| 13. | 32 mos. | D. G. | 3/24/32 | 18 |
| | | Poor cooperation. Cried and wanted to be dressed. | | |
| 11. | 33 mos. | B. P. | 4/18/32 | 19 |
| | | Billy would frankly rather not be bothered with trying to dress himself; is interested though in social element, thus some of the "can'ts." | | |
| 11. | 33 mos. | B. P. | 4/18/32 | 19 |
| | | "Put stockin on." Re-iterated throughout, "I can't." | | |
| 11. | 33 mos. | B. P. | 4/19/32 | 19 |
| | | Asked all through, "Is this right?" | | |
| 12. | 33 mos. | A. S. | 4/14/32 | 20 |
| | | "There we are. I found the place to put my arms" (looked for front opening). | | |
| 14. | 33 mos. | R. B. | 2/17/32 | 21 |
| | | Cried; refused (on shoes). | | |
| 13. | 33 mos. | D. G. | 4/22/32 | 21 ½ |
| | | Said "I can't" at every difficulty. | | |
| 13. | 33 mos. | D. G. | 4/25/32 | 21 ½ |
| | | Cried and refused to try. | | |

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|-----|---------|---|---------|----|
| 14. | 34 mos. | R. B. | 3/14/32 | 22 |
| | | "Put my other sock on." Whined when he made a mistake. | | |
| 14. | 34 mos. | R. B. | 3/16/32 | 22 |
| | | "I'm not finished yet, no." Whined, practically cried at slightest difficulty. Started to put second sock over first then looked and said "No." "Can't put it on; too hard." | | |
| 16. | 36 mos. | D. R. | 3/8/32 | 23 |
| | | "There sleeve; that's sleeve. Put shoes." Effort quite extraordinary. Worked for many minutes to adjust sock and put on suit top front to front. Intent on what he was doing. Time consumed in effort to put things on; no playing. Did gaze around the room several times. | | |
| 16. | 36 mos. | D. R. | 3/11/32 | 23 |
| | | Seemed to expect to be dressed; interested in putting on socks and shoes. | | |
| 15. | 37 mos. | W. D. G. | 4/7/32 | 24 |
| | | Just sat and watched me; repeated all directions but did nothing. Knew when laced wrong. | | |
| 16. | 37 mos. | D. R. | 4/8/32 | 25 |
| | | Worked extremely hard at lacing; corrected a mistake he made. | | |
| 17. | 38 mos. | H. C. | 2/9/32 | 26 |
| | | Helen showed self-criticism good. "I can't tie them up." Fine coordination. Motor skill in putting her clothes on. Verbal control of what she was doing. "Put this on. No, that not right." Tried to have me do (it). Wanted to see Merrill-Palmer material. | | |
| 17. | 38 mos. | H. C. | 2/10/32 | 26 |
| | | "I can't button these." | | |
| 18. | 38 mos. | C. W. | 3/23/32 | 27 |
| | | "You do it" (adjust sock). | | |

17. 39 mos. H. C. 3/14/32 28
Said "Oh, oh" when found on wrong foot.
"Hard turn 'round there" (sock).
"Where the other stocking is?"
19. 40 mos. B. Y. 3/8/32 29
Not interested in dressing himself. Whined;
a crying whine when prevented from running all over the room. Cried when recorder would not help him. "I can't put this on" (underwear).
20. 40 mos. R. A. 2/11/32 30
"What's going to be at school when Mrs. White closes it? There's going to be toys and once we ate outdoors when Miss Appleman was here. I can't see how to (buttons in back). One day when I was older Berta, Me and Borne were up here dressing when we were in the older group. I saw a little boy try to tie it but he had to tell his teacher." All above said spontaneously. Recorder said only "yes" and dreamily. Good self criticism. Verbal control of what he was doing.
20. 40 mos. R. A. 2/12/32 30
"I can't see back buttons so I don't know where the buttons go. Is this right foot? It's too tight. Let's put it on other one."
21. 41 mos. R. M. 2/29/32 31
"I have some windows home. What's that tree doing there? It's back and swinging forwards. Why you writing there for? Where did you get those shoes?" Played with her clothing, swinging it back. Held her underclothing and tramped around the room so that I would not see that she had buttoned it incorrectly. Sang "High Stepping Horses. I'm running. Horses galloping. Down the Street every day

many horses walk. All the ducklings swim without a—Here we go a tiptoe, tiptoe. I'm jumping. I'm running." While singing was buttoning waist; worked better while singing. "Tramp, tramp, tramping. Warm kitties, soft kitties. Tiptoe, tiptoe, tiptoe aeroplane. All the children are swimming in the water. Come chick, chick."

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|-----|---------|---|---------|----|
| 22. | 41 mos. | D. P. | 2/25/32 | 32 |
| | | "Shucks, that isn't it" (when found that underwear was on wrong side). Frequently said "Oh shot" (at a difficulty). "Well, how does this work? How do you put it on? Oh, this is hard. I can't get it on. If any people get old they die. If I was getting old and clumsy, I wish I would die. If you spank people very hard when they're naughty they couldn't set down. I went down to the store and bought new shoes." | | |
| 19. | 41 mos. | B. Y. | 4/12/32 | 33 |
| | | "Would you turn these around for me?" (socks). | | |
| 20. | 41 mos. | R. A. | 3/15/32 | 34 |
| | | "This one belongs on this foot. The white piece belongs in the back." | | |
| 20. | 41 mos. | R. A. | 3/16/32 | 34 |
| | | "My goodness, aren't these hard shoes?" (wrong foot). Takes it off and tries on other. | | |
| 21 | 42 mos. | R. M. | 3/31/32 | 35 |
| | | "You write" (embarrassed at being watched). | | |
| 21. | 42 mos. | R. M. | 3/31/32 | 35 |
| | | "I can't on" (sock pulled up). | | |
| 22. | 42 mos. | D. P. | 3/31/32 | 36 |
| | | "Is this the arm?" | | |

22. 42 mos. D. P. 4/1/32 36
 "I can't button this."
23. 43 mos. P. H. 3/22/32 37
 "These are my best stockings. Turn it for me" (sock).
23. 43 mos. P. H. 4/11/32 37
 "I can't always do this all by myself" (sock).
22. 43 mos. D. P. 4/29/32 38
 Very talkative.
22. 43 mos. D. P. 4/28/32 38
 "I can't get the last one through, and here it goes" (button) torso-leg.
25. 44 mos. P. V. 2/3/32 39
 "It's wrong cause it hurts. This is 'sposed in front" (embroidery—dress) (shoe on wrong foot). Very talkative.
27. 45 mos. A. T. 2/19/32 40
 "See that was easy." Time taken in lacing left shoe placed on right foot. Skill shown in the way she pulled up her shoe-laces which were barely long enough. Objected slightly to my taking her shoe off. Said "See what you did." Very intent and skillful.
27. 45 mos. A. T. 3/30/32 40
 "Oh! I got it on backwards" (dress).
25. 45 mos. P. V. 3/2/32 41
 "I got those wrong" (buttons on dress). Very talkative. "You help me, will you?" (bow knot).
25. 45 mos. P. V. 3/10/32 41
 "Look, I can buckle my own shoes."
25. 46 mos. P. V. 4/4/32 42
 "Sh! I'll take my arms out and whirl it around to the front" (when reminded dress is on backwards).
25. 46 mos. P. V. 4/5/32 42
 "Would you turn this? Oh there it goes" (heel of sock).

- | | | | | |
|-----|---------|---|---------|-----|
| 27. | 46 mos. | A. T. | 4/28/32 | 43 |
| | | "Ouch, I have it on backwards" (dress). | | |
| 27. | 46 mos. | A. T. | 4/29/32 | 43 |
| | | "Oh, I have it on backwards" (dress). | | |
| 31. | 47 mos. | K. G. | 3/28/32 | 44 |
| | | "You put my dress on." | | |
| 29. | 48 mos. | B. K. | 4/7/32 | 45 |
| | | Meandered around room; did not speak during entire dressing time. | | |
| 29. | 48 mos. | B. K. | 4/8/32 | 45 |
| | | "I can't button this" (side buttons on suit). | | |
| 30. | 48 mos. | H. S. | | 46 |
| | | Took second shoe off 5 times before he finally got it on. | | |
| 33. | 48 mos. | M. D. | 3/18/32 | 47 |
| | | Tips of 2 shoe-laces gone. Marie wet the ends and then twisted them to get them through the holes. | | |
| 33. | 49 mos. | M. D. | 4/21/32 | 48 |
| | | "This is such a hard one" (shoe). | | |
| 34. | 50 mos. | D. W. | 3/21/32 | 49 |
| | | "Oh, I missed one, didn't I?" (button leg-torso). | | |
| 34. | 50 mos. | D. W. | 3/22/32 | 49 |
| | | "Now my suit goes on. Oh! a button off."
David talked constantly during the entire dressing time. Was angry when observer wouldn't answer him. | | |
| y. | 50 mos. | J. M. | 5/25/34 | 49½ |
| | | Child interested in speed of sock slipping on easily. Says "Long time," referring to arm 2 in right hole. | | |
| 36. | 51 mos. | D. P. | 3/16/32 | 50 |
| | | "Will you button this top button?" | | |
| 37. | 52 mos. | M. J. D. | 3/29/32 | 51 |
| | | Took off first sock twice to get it straight. | | |
| 38. | 52 mos. | D. R. | 3/16/32 | 52 |
| | | "Darn this sock. Oh, it's twisted ain't it?" (torso-leg). | | |

36. 52 mos. D. P. 4/20/32 53
Put sock on, took it off and put it on as
B. P.
36. 52 mos. D. P. 4/22/32 53
Very talkative.
38. 53 mos. D. R. 4/13/32 54
"Broken buttons are hard, but I'm big"
(torso-leg).
40. 53 mos. B. P. 2/26/32 55
Sock right side out, toes pushed in, sock
pulled up over toes, found this made it
wrong side out, so did whole process over
again.
42. 56 mos. H. R. 2/3/32 57
Refused to turn it right side out (torso-leg).
44. 60 mos. M. L. P. 2/11/32 58
"My this is hard; I mean it was 'cause it's
on now" (shoe).
45. 61 mos. Sh. Mc.K. 2/16/32 59
"This hasn't any tongue" (shoe).
45. 61 mos. Sh. Mc.K. 2/17/32 59
"I didn't need you to tell me because I know
until I get a new tongue" (shoe).
45. 62 mos. Sh. Mc.K. 3/15/32 69
"No! Wrong, tapes in front."

XII

RELATIONSHIP BETWEEN FACTORS

It would be worthwhile to know what relationship exists between the ability to dress, time, number of garments, age at entrance into nursery school, attendance at school, verbal helps, mental age. To discover these relationships the method of correlations was used. The difficulties encountered in the material were: the small number of cases, especially at the younger age levels; the nearly perfect learning at the upper age levels; the over-potency of chronological age; the fact of insufficient observations upon children just entering nursery school so that differences based on home versus school training were hidden; and the fact that when all cases in the study were used in one distribution, most of the correlations were non-linear and this prevented the partialling out of factors such as chronological age.

The problem was first attacked by the simplest methods: the correlations within each age group are given in Table 13.

It will be seen that many of the correlations are low, that often the signs vary erratically, and most of the reliabilities of the measures are low. It would seem safe, therefore, to look for constant trends in relationships with small attention to the contradictions found in the first, and in the last two age groups where the number of cases is very small, and in the first age group where the teacher enters very largely into the situation. Several trends of relationships will be indicated.

There is a negative relationship between ability and time, and between ability and verbal help. There is a positive relationship between time and verbal help, between time and number of garment units, and between ability and IQ within the middle age groups. There is a very contradictory and variable relationship between ability and school entrance and attendance.

This contradictory relationship between ability and school attendance has practical and theoretical significance. It implies that, perhaps, maturation and not the home or school training is responsible for the increased ability to dress. In order to tease out the real facts concerning home and school training in relation to the ability to dress, several methods were used. Correlations were calculated using all cases in one distribution. All of the correlations were positive, some high, but chronological age was so much a part of the factors related that unless it was separated out, the correlations had small meaning. It happened that so few of the correlations were linear that partial correlations had to be abandoned.

For this reason a different method was employed to find the effect of longer attendance at nursery school on ability to dress. The aim was to keep the chronological age at time of observation constant and vary the attendance. For each case of a given chronological age there was found a match, e.g., another case of the same chronological age but with a longer or shorter attendance record. This method held chronological age constant and resulted in two distributions; one distribution represented longer attendance cases, the other

TABLE 13

CORRELATIONS

Factors influencing ability to dress

T = Time, Ab = Ability, GU = Garment units, Att. = Attendance, H = Verbal helps.

No. children	No. cases	No. observ.	Age in mos.	Age group	T.-Ab.	T.-H.	T.-GU.	T.-IQ.	T.-Att.	T.-Age at entrance
3	7	14	18-23	Gr. I <i>r</i>	-.29	-.08	+.56	-.10	-.40	+.12
				P.E. _r	±.17	.18	.12	.18	.15	.18
5	9	18	24-29	Gr. II <i>r</i>	+.01	+.15	+.47	+.05	+.25	+.02
				P.E. _r	±.17	.16	.12	.16	.15	.16
7	19	38	30-35	Gr. III <i>r</i>	-.55	+.74	+.36	-.25	+.17	-.07
				P.E. _r	±.08	.05	.10	.10	.11	.11
8	16	32	36-41	Gr. IV <i>r</i>	-.44	+.54	+.31	-.15	+.26	+.38
				P.E. _r	±.10	.08	.11	.12	.11	.10
14	30	60	42-47	Gr. V <i>r</i>	-.16	+.16	+.24	+.09	-.21	-.09
				P.E. _r	±.09	.09	.08	.09	.08	.09
12	23	46	48-53	Gr. VI <i>r</i>	-.38	+.64	-.14	-.23	+.27	-.29
				P.E. _r	±.09	.06	.10	.09	.09	.09
4	11	22	54-59	Gr. VII <i>r</i>	-.02	+.31	+.49	-.02	+.04	-.49
				P.E. _r	±.14	.13	.11	.14	.14	.11
2	6	12	60-65	Gr. VIII <i>r</i>	+.09	+.61	-.07	-.49	+.21	-.49
				P.E. _r	±.19	.12	.19	.15	.19	.15

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Formulae used:

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$$

$$P.E. = \frac{.6745(1-r^2)}{\sqrt{N}}$$

TABLE 13 (*continued*)

Ab.-H.	Ab.-G.U.	Ab.-IQ	Ab.-Att.	Ab.-age at Ent.	H.-G.U.	H.-IQ	H.-Att.	H.-age at entrance
-.41	-.60	-.48	+.35	+.03	+.21	-.09	-.58	+.13
.15	.12	.14	.16	.18	.17	.18	.12	.18
-.18	+.22	+.14	+.47	-.22	+.02	-.27	+.10	+.18
.15	.15	.16	.12	.15	.16	.15	.16	.15
-.53	-.08	+.63	-.17	-.09	+.23	-.30	+.16	-.03
.08	.11	.07	.11	.11	.10	.10	.11	.11
-.68	+.05	+.57	-.46	-.50	-.02	-.28	+.36	+.40
.06	.12	.08	.09	.09	.12	.11	.10	.10
-.45	+.23	+.23	-.18	-.18	-.14	-.11	-.26	+.23
.07	.08	.08	.08	.08	.09	.09	.08	.08
-.71	+.05	+.32	+.14	-.03	-.09	-.18	-.03	-.002
.05	.10	.09	.10	.10	.10	.10	.10	.10
-.13	-.42	-.57	+.48	+.006	+.08	+.04	-.15	-.10
.14	.12	.10	.11	.14	.14	.14	.14	.14
-.21	-.26	+.18	+.02	+.18	-.58	-.83	+.58	-.83
.19	.18	.19	.20	.19	.13	.06	.11	.06

TABLE 14

ABILITY TO DRESS

A comparison between the ability to dress in children who have attended nursery school a long time and those who have attended a shorter time. Calculations made from the percentage of success in best trials of all children observed. Section 2 percentage of attendance used. Section 4 extreme cases only.

Section	1		2		3		4		5		6	
Length of Att. Constant =	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	CA	CA	CA	CA	MA	MA	MA	MA	Age at entrance	Age at entrance	IQ	IQ
Total no. cases	121	121	121	121	121	121	121	121	121	121	121	121
No matches	8	8	8	8	13	13	25	25	0	0	1	1
Cases used	113	113	113	113	108	108	96	96	121	121	120	120
Mean	58	55	59	54	54	54	48	48	58	63	57	63
σ	33.05	35.02	32.54	35.19	35.20	35.41	35.06	35.06	32.23	37.65	34.58	31.44
Twenty-five percentile	16.99	16.09	15.35	15.94	15.75	15.74	13.15	15.50	12.32	17.35	15.42	17.04
Fifty percentile	79	84	75	84	82	74	82	67	88	62	82	74
Seventy-five percentile	89	90	89	90.5	89	88.5	89	89	92	86	89	89
Range	95	94	95	94	94	94	93	94	97	91	94	92
Diff. between av's & av's	1.97	2.65	2.65	2.79	2.79	2.79	2.83	2.83	10.85	10.85	3.14	3.14
S.D. diff.	3.17	2.25	2.25	3.58	3.58	3.58	3.03	3.03	2.72	2.72	4.38	4.38
Experimental coefficient	22	.42	.42	.25	.25	.25	.34	.34	1.41	1.41	.258	.258
Conclusions:	Chances that difference is 0, are											
Section 1. More days in attendance at nursery school tend to produce a negative effect if CA matched, i.e. (same)	2.5 to 1											
Section 2. Greater proportion of days at nursery school tends to produce a negative effect if CA matched, i.e. (same)	6.5 to 1											
Section 3. More days in attendance at nursery school tend to produce a positive effect if MA matched, i.e. (same)	3.9 to 1											
Section 4. More days in attendance at nursery school tend to produce a positive effect if MA matched, i.e. (same)	6 to 1											
Section 5. More days in attendance at nursery school tend to produce a positive effect if Age at Entrance matched, i.e. (same)	20000 to 1											
Section 6. More days in attendance at nursery school tend to produce a positive effect if IQ matched, i.e. (same)	3.9 to 1											

Note: In Section 1—days in attendance is the unit of calculation, in Section 2, percentage of attendance
 Sections 1, 2, 3, 5, 6—cases above average attendance = Long Attendance cases; below average = short attendance cases.
 Section 4—Extreme cases only. All matched.

distribution shorter attendance cases. Similar paired distributions were made where mental age was held constant by matching; another pair of distributions where age at entrance was held constant; and another where IQ was held constant. The results are found in Table 14.

In this table the only reliable difference in the dressing ability of children of long and of shorter attendance is that found for children who entered nursery school at the same chronological age. But here longer attendance results in the children's being older at the time of observation than the children who have attended a short time. Increased ability might well be merely a matter of age, not attendance. To meet this inconclusiveness in results, cases were matched which were the same CA at the time of observation but which differed in the fact that one of a pair was younger or older than the other child in the pair at the time of his entrance into nursery school. The results in this case are that the mean percentage of success for those entering young was 83.38, S.D. 16.31; that for those entering when older, 85.37, S.D. 15.23; the Difference 1.99, S.D._{diff.} 2.70, Experimental Coefficient .27. Again the difference is unreliable between the two groups. Moreover, it so happened that early entrance was accompanied by longer attendance in all but seven cases of the 104 cases matched, so that nursery-school training was given longer and earlier to 97 cases, and yet the results do not indicate the superior benefit of nursery school versus home training in learning to dress. Research using more cases, especially at the early ages,

and observations made soon after the child enters nursery school is indicated.

We may conclude from the data that the less time a child takes to dress, the fewer the verbal helps given, the greater is the likelihood that he is the more efficient in dressing. On the other hand, the more time a child is taking to dress, the greater is the likelihood that he is getting more verbal helps, and that he is wearing more clothing. Also, it may be noted that there is, between the ages of two and one-half and four and one-half years, a positive relationship between intelligence, as measured by Stanford-Binet and Kuhlmann, and ability to dress.

In learning to dress, the more important factor is chronological age rather than training. More research is suggested to determine more exactly the comparative value of maturation with some training, as at home, versus maturation with more intensive training, possibly at nursery school.

XIII

SUMMARY AND CONCLUSIONS

1. A scale for measuring dressing ability among preschool children has been developed and used with a group of 45 nursery-school children between the ages of 18 and 65 months. The children were observed twice a month for a period of three months; February, March, April 1932, at the National Child Research Center, Washington, D. C.; this procedure yielded a maximum of six observations per child.

2. The reliability of the scoring method is indicated by the correlation $+ .90 \pm .02$ between dressing scores on the first two successive observations; when chronological age was held constant the correlation was $+ .78 \pm .04$.

3. Marked individual differences in nursery-school children are shown in their ability to dress, the ability to learn to dress, the ability to put on the several garments, in the time it takes to dress, and in the number of verbal helps required.

4. Chronological age, or maturation is a most important factor in determining dressing ability. The correlation between age and ability on the first observation was $+ .72 \pm .05$; on the second observation $+ .78 \pm .04$.

5. A conservative estimate of a child's ability to dress, as represented by the lowest range and lowest quartile scores in this study, is as follows:

CA	2 years	2½	3	3½	4	4½	5
% of success	12-25	22-40	35-49	48-67	64-85	79-91	90-91

6. Aside from individual differences, the period of most rapid improvement in learning to dress is between one and one-half to three and one-half years.

7. In learning to dress there are differences in the difficulties presented. Some garments are easier to put on than others; stocking and leg garments are the easier, shoes the more difficult to master completely. Likewise some dressing units are easier than others. Getting a leg or arm into some hole, pulling up a garment, keeping it approximately placed in the correct position, are the easier units. The more difficult units are adjustment, orientation, and fastenings, such as buttoning, tying, and lacing.

8. Learning to dress is a matter of learning a process at levels of increasing difficulty. Learning to put on a shoe, for example, is an act requiring several levels of ability, or a number of skills acquired at different age levels.

9. A dressing "profile" for an individual child may be obtained by checking the ability of the child observed against an average performance of children as found in this study, Table 7.

10. The individual differences in the time taken to dress are so marked among nursery-school children that the average is not a highly representative measure. Children between two and one-half and three and one-half require the longest time to dress. A time allowance for dressing would be: one to one and one-half years, 15 to 25 minutes; two and one-half to four and one-half years, 5 to 45 minutes; four and one-half to five and one-half years, 5 to 15 minutes.

11. The number of times a child is talked to while he is dressing varies according to the child's age and the given day. The average number of verbal helps is greatest for the two and one-half to three and one-half-year-old child and then tends to decrease. The verbal helps required may vary from 0 to 29 at two to two and one-half years; while at five years, the maximum number may be nine. Also, only 5 per cent of the children required about the same amount of verbal help from one observation day to the next.

12. Sex differences are tentatively indicated in the better average ability of girls between two and one-half to four and one-half years. Girls also tend to dress faster. The variability was greater among the boys.

13. The average number of dressing units in children's clothing from one age group to the next is fairly constant, but some individuals have approximately from 20 to 40 more dressing units in their apparel than other children in the same age group.

14. Popularity of the slip-over torso, the elastic held leg garment and front fastening would be justified by the ease of mastery; the popularity of the short sock, laced shoe, fastened styles versus slip-on styles is not so justified.

15. As children grow older their clothes tend to include more styles of garments, but this relationship between the increase in age and the number of styles worn is not perfect.

16. Verification of the quantitative findings are to be found in the children's remarks and teacher's observation of the children's behavior while dressing. Help-

lessness is marked between 20 and 30 months; learning, effort, and discouragement at difficulties between 30 and 40 months; and satisfaction and skill between 40 and 50 months. Remarks about specific items (bow knot, etc.) further confirm the findings about the relative difficulty of the garment units.

17. Correlations indicate that the fast dresser is usually the one who is the more efficient, and the one receiving fewer verbal helps. The child who wears more clothes, as indicated by more dressing units in his clothing, takes longer to dress; and the child between the ages of two and one-half to four and one-half with the higher IQ tends to be the more efficient dresser.

The findings as to the effect of the more systematic training to dress oneself in nursery school are not conclusive. The developmental factor seems to be more potent than routine training.

More research is needed. Attacks proposed are: Observation of an increased number of cases, and observation of individual children over a period of some years; further analysis of maturation versus training and of the difficulties of orientation in dressing; moving picture of individuals dressing at different ages would be valuable; revision of the scale to contain more difficult units is indicated; invention of a fastening more suitable for the ability of young children than buttons, lacing and tying is needed; and a joint consideration of a garment's value from the standpoint of ease, health, cost, etc., should be undertaken.

REFERENCES

1. ANDRUS, R. An inventory of the habits of children from two to five years of age. New York: Teach. Coll. Bur. Publ., 1928. Pp. 51. (See esp. pp. 3-5, 27-28, 45.)
2. ARMSTRONG, E. A study of motor control in young children as applied to dressing themselves, the ability of children to fasten and unfasten buttons. Univ. Iowa, 1927 (unpublished). (See esp. p. 29.)
3. BLANTON, S., & BLANTON, M. G. Child guidance. New York: Century, 1927. Pp. xviii + 301. (See esp. p. 172.)
4. BLATZ, W. E., & BOTT, H. Parents and the preschool child. New York: Morrow, 1929. Pp. 352. (See esp. p. 105.)
5. FAEGRE, M. L., & ANDERSON, J. E. Child care and training. Minneapolis: Univ. Minnesota Press, 1929. Pp. vi + 274. (See esp. p. 31.)
6. FOSTER, J. C., & MATTSON, M. L. Nursery school procedure. New York: Appleton, 1929. Pp. xiv + 220. (See esp. p. 179.)
7. HOLZINGER, K. G. Statistical method for students in education. Boston: Ginn, 1928. Pp. viii + 372. (See esp. p. 232.)
8. JOHNSON, H. M. Children in the nursery school. New York: Day, 1928. Pp. xx + 324. (See esp. p. 24.)
9. ———. A nursery school experiment. Bureau of Educational Experiments. 1924, p. 33.
10. LANGDON, G. Home guidance for young children. New York: Day, 1931. Pp. 552.
11. RAND, W., SWEENEY, M. E., & VINCENT, E. L. Growth and development of the young child. Philadelphia: Saunders, 1930. Pp. 394.
12. WAGONER, L. C., & ARMSTRONG, E. Motor control of children as involved in the dressing process. *J. Genet. Psychol.*, 1928, 35, 84-97.
13. WARING, E. B., & WILKER, M. The behavior of young children. Book II. Dressing—toilet—washing. New York: Scribner's Sons, 1930. Pp. ix + 151.
14. WATSON, J. B. Psychological care of infant and child. New York: Norton, 1928. Pp. 195. (See esp. p. 108.)

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A STUDY OF THE PRESENT SOCIAL STA-
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THEY WERE IN ELEMENTARY SCHOOLS,
WERE CLASSIFIED AS MENTALLY
DEFICIENT*

*From the Department of Educational Psychology and Measurements
of the University of Nebraska*

By

WARREN ROBERT BALLER

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WARREN ROBERT BALLER

LINCOLN, NEBRASKA

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I

INTRODUCTION

MENTAL DEFICIENCY AND SOCIAL INADEQUACY

The problem of how to provide for those individuals who are physically or mentally handicapped is recognized as a matter of considerable importance to society. Not only is it important from the standpoint of the burden which society must shoulder in caring for its more unfortunate members, but there is the additional responsibility of helping these individuals make adjustments which lead to their own greatest comfort and happiness. Both considerations emphasize the necessity of finding out all that it is possible to know about the conditions that accompany the various types of pronounced social inadequacy.

One of the major questions associated with the problem of inadequate adjustment is that of the relationship between social incompetence and mental deficiency. Are persons of comparatively limited intelligence more apt to be antisocial and destructive or more susceptible to bad moral influence than persons of average intelligence? Of no less importance is the additional question of their ability to provide for themselves economically under varying degrees of supervision and regulation.

Investigations which have been directed at the function of mental deficiency as a factor in social inadequacy have taken a number of different lines of attack. It is not intended here to review the various procedures

which have been employed in this field of study, but to indicate what aspects of the total situation have been investigated and will help in disclosing the specific problems which justify additional research.

METHODS OF INVESTIGATING THE CONSEQUENCES OF MENTAL DEFICIENCY

One method which has been used in a number of attempts to analyze the rôle of limited intelligence in social incompetence is to examine the mental ability of persons whose misconduct or other social failure has resulted in their commitment to institutions. While this procedure has led to many extravagant and unwarranted conclusions, particularly when the standards for determining mental subnormality were faulty (a condition which may operate in other procedures), there has, nevertheless, been some valuable information obtained through this method of investigation.

Another approach to the problem of how mentally subnormal individuals adjust to their environments is to record the progress of those who have been returned to communities after a period of training in institutions. Quite an accumulation of information has been gained from studies of this kind, and, while the conclusions are sharply conflicting in several instances, an examination of the results of these investigations will show that this particular phase of the problem of subnormality has not been neglected.

Both of the procedures referred to above are limited, in the main, to situations involving individuals who

have been committed to institutions either because of specific violations of the law or because they were deemed unable to make their way in society without assistance. This leaves unanswered the question of how the larger body of mentally subnormal individuals, who have never been in institutions, manage to get along in their environments.

THE PROBLEM OF ADJUSTMENT OF THE MENTALLY HANDICAPPED WHO HAVE NOT BEEN IN INSTITUTIONS

Dr. Edgar A. Doll, whose interest in the many problems of mental subnormality has led either directly or indirectly to a great many valuable studies in the field, has emphasized the need of investigating the social adjustment of mentally subnormal individuals who have not been in institutions. This is a line of investigation which he has urged for some time and which, because of his suggestion, has been undertaken in several studies. (These studies are reviewed in the next chapter.) Dr. Doll has recently stressed this matter again in pointing out that "Our approach to the problems of mental deficiency today is limited to a body of knowledge gained from the social failures within this class." He adds, "Less than ten per cent of all the feeble-minded, and probably not more than five per cent, ever reach our public institutions. . . . We cannot much longer overlook the fact that the remaining 90 to 95 per cent who do *not* reach institutions are not all social failures even though their success may be only at a low cultural level" (12, p. 37).

There are several difficulties which beset any attempt to carry out Dr. Doll's suggestion and to learn what happens to the mentally subnormal who never come to institutions.

At the very outset the question will be raised: Upon what basis are you going to call a person mentally deficient if he has contrived to make a reasonably satisfactory adjustment to his environment? It will be pointed out that the very definition of feeble-mindedness, in adults, includes the factor of inability to make a satisfactory adjustment to society and to call a person feeble-minded in the face of his adequate adjustment is grossly contradictory and unreasonable. All reference to intelligence quotients and poor grades in school will hardly save the situation. In this connection a person will do well to consider the stern cautions of Tredgold (53, pp. 4-6) and Wallin (55) in their warnings against overly simplified criteria of feeble-mindedness. Dr. Tredgold's attitude toward the naïve reliance which is too often placed in mental tests or in other measurements, unsupported by reliable supplementary evidence, is expressed in statements of this sort: "The fact is undeniable that the intelligence quotient, taken by itself, is a very imperfect measure of those factors of mind which determine independent and successful adaptation to the requirements of life" (53, p. 6).

Keeping in mind the objections to classifying individuals as mentally deficient in the absence of evidence that they have failed to adapt themselves to their social surroundings, the fact still remains that many individuals of comparatively limited mental ability do

manage to be law-abiding and useful even without supervision. It is not begging the question to put the matter in this way, for there are other factors such as the right combination of environmental circumstances, advantages of personality, or finding just the right task to perform, which have long been recognized as influential enough to compensate for that which can be rightly diagnosed as subnormal intelligence. Hence, the question of how these individuals go about adjusting themselves to the demands of life still stands as worthy of consideration and careful investigation.

THE PURPOSE OF THE PRESENT STUDY

It was with the hope of throwing additional light upon the factors involved in the social adjustment of mentally subnormal persons who had not come under institutional supervision that the present study was undertaken. More correctly stated, the plan of this investigation was to trace the careers of a particular group of individuals whose diagnoses of mental deficiency had been made prior to the social successes or failures which later life was to bring. The title which the study bears emphasizes the matter of present status but, as will become plain in the discussion of the procedure, the follow-up included as much as it was possible to learn about the lives of these subjects.

Since the "follow-up," which this study necessitated, carries through several years of economic depression, particular attention is given to the effect of this circumstance upon the success or failure of the subjects.

II

THE LITERATURE DEALING WITH THE SOCIAL ADJUSTMENT OF MENTALLY DEFICIENT INDIVIDUALS

Studies which take up the general question of the social adjustment of the mentally subnormal tend to emphasize two rather distinct purposes. One has to do with the matter of moral stability among the mentally deficient, and the other stresses the evidence relative to the economic status and occupational histories of this class of individuals.

The investigations whose results throw some light upon the matter of adjustment may be differentiated in still another way. As mentioned in the introduction, the evidence may be gained by gathering "follow-up" data on a group of subjects who have been classified as mentally subnormal or, as a second procedure, by examining individuals already under observation for their misdeeds, to discover the relation of intelligence to the kinds of offense charged against them. The "follow-up" method has been used with two rather sharply differentiated types of subjects, namely, those who have been released in communities after institutional commitments and those whose "follow-up" begins previous to any institutional confinement. These distinctions will be observed in the following discussion.

THE INCIDENCE OF MENTAL DEFICIENCY IN GROUPS OF DELINQUENTS

It was mentioned in the introductory chapter that much of the disagreement regarding the consequences of low intelligence has developed around the question of whether or not feeble-mindedness and delinquency have a direct and pronounced relationship. It is noteworthy that opinion on this matter has been so definitely modified in such a short time; less than 20 years will cover the period from the extremely discouraging viewpoints of the early days of the standardized testing movement to the present more optimistic conclusions.

With the introduction of standardized intelligence tests there came a wholesale administration of them to individuals confined in institutions and, among other inmates, the mentally deficient. With norms which had not been subjected to the rigid verification which came later (*as during and since the army draft testing program*) and with the use of the tests by many inexperienced testers, it is not to be wondered at that some of the conclusions relative to the mental status of institutional populations were badly exaggerated. If the mental age standards for normal subjects were too high (there have been charges that in some cases the norms for average intelligence were from one to two years too high) this would help explain why such a large percentage of the inmates of correctional institutions measured low in intelligence, thus permitting the inference that feeble-mindedness was the principal cause of delinquency and general social failure.

Unfortunately some of the foremost names in the new field of mental testing became associated with the doctrine of the delinquent moron. Professor L. M. Terman's reference to "the fearful rôle played by mental deficiency in . . . delinquency" (49, p. 9), Goddard's statements (21) that "every investigation of the mentality of criminals, misdemeanants, delinquents, and other antisocial groups has proven beyond the possibility of contradiction that nearly all persons in these classes, and in some cases all, are of low intelligence" and ". . . The greatest single cause of delinquency and crime is low grade mentality," and observations of a like nature coming from recognized authorities in psychology furnished the substance necessary to provide good anchorage for the theory that low intelligence and antisocial conduct are closely related.

The tendency away from the discouraging picture set forth in the quotations above was led by an individual who, earlier, shared the opinion that feeble-mindedness practically precluded social usefulness. This person was Dr. Walter E. Fernald whose earlier attitude is represented in the statement, "The feeble-minded are a parasitic, predatory class, never capable of self-support or managing their own affairs. The great majority ultimately become public charges in some form. They cause unutterable sorrow at home and are a menace and danger to society" (19). His change of attitude is reflected in a 1925 publication :

A few years ago, wholesale institutional segregation became almost universally accepted as the only logical solution of an otherwise hopeless problem. . . . Our early

knowledge of the feeble-minded was almost entirely obtained from institutional inmates and they were largely of the hereditary class. It was natural to assume that nearly all others were of this class, and as nearly all of these inmates had been troublesome or vicious in the community, it was inferred that all feeble-minded were almost sure to become dangerous members of society. . . . but within a few years many things have happened to make us believe that we have been far too sweeping in some of our generalizations and deductions concerning the feeble-minded (17, pp. 110-112).

Dr. Fernald goes on, in this discussion, to indicate the ways in which the feeble-minded often are contributors to their own welfare and to that of others, and outlines a program of extra-institutional supervision which is highly endorsed by leading authorities in the field today.

Dr. William Healy and Miss Augusta Bronner are others whose investigations gave limited support to the idea that the feeble-minded were by nature hopelessly antisocial. *Results of their careful studies showed that for 701 girls and 1625 boys, examined in connection with charges of delinquency, the median IQ was 90. They also point out the fact that the IQ of 90 on their charts "is near the median for the general population, instead of IQ one hundred" (26, p. 155). The findings of Murchison in examining adult criminals (36, Chap. VIII), of Stanger (45) with inmates of reformatories and prisons in New Jersey, of Guilford and Weber with male reformatory inmates (56), of Cyril Burt in a comparison of juvenile delinquents with non-delinquents (6, p. 286), and of Fernald, Hayes, and Dawley with delinquent women in institutions (16, p. 527)*

argue for the same general conclusion: that delinquency and low mentality do not bear an unequivocal relationship. That this relationship is complicated by the presence of other factors such as race and social status, which may make for an indirect connection, only, between delinquency and intelligence, is shown by the studies of Dr. John Slawson (44, p. 527).

The evidence which has been reviewed, up to this point, with the exception of Fernald's statements, has been taken from studies with delinquent individuals. Inferences with respect to the mentally deficient population as a whole were drawn indirectly. We now proceed to an examination of the literature dealing with the adjustments of individuals following parole from institutions.

THE SOCIAL ADJUSTMENT OF SUBNORMALS DISCHARGED FROM INSTITUTIONS

One of the earliest studies reported for the adjustment of individuals discharged from institutions is that of Dr. Walter E. Fernald (18). It was possible to trace 472 boys and 176 girls of an original 905 replacements from the State School at Waverly, Massachusetts. Of the girls, 62 had been recommitted to Waverly and 24 had died. Of the 90 remaining in the community, 52 were well behaved, eight single women were self-supporting, and 11 were successfully married. The other 33 were wholly or partially dependent upon relatives. Of the 90 women, 48 had offended by sex misconduct; 11 were unmarried mothers.

Of the 472 boys, there had been 143 recommitted to Waverly and other institutions and 74 had died. Those still in the community numbered 273, and of these, 28 were self-supporting; 222 were partially or wholly dependent upon relatives. Those sentenced to penal institutions numbered 32, with 23 others arrested but not sentenced.

Dr. Fernald's report was made in 1919, and three years later a report for 100 boys paroled from the same school was published by Mathews (35). Of the 100 boys, 78 were successfully supporting themselves; three others had been returned to Waverly. Only three of the boys had ever been arrested. Two others were committed to reform schools. The better showing of this group as compared with those investigated in Fernald's report is attributed to the long training of the 100 boys and the fact that they were, for the most part, still under supervision.

In a study of individuals who had been discharged from the Rome, New York, State School between 1904 and 1924, Roy W. Foley (24) was able to get reasonably adequate information for 375 males and 261 females and with regard to conduct found that 21 per cent of the former and eight per cent of the latter had court records. That some of the offenses were of a minor nature and that other instances of misconduct may have been unrecorded is pointed out by Foley. With regard to economic adjustment he found that 79 per cent of the males had followed various occupations with some degree of success. Only five per cent had required outside aid. Of the females, 62% had remunera-

tive occupations and only eight per cent had received public aid. Foley emphasizes the value that a control study of normals would have had for purposes of interpretation.

Storrs (48) has reported an investigation made of cases discharged from Letchworth Village, Thiells, New York. The fact that 72 per cent of the 616 cases whose records could be followed up had made successful adjustments to extra-institutional life seemed to point to the error in suspecting that low mentality will inevitably lead to antisocial conduct and also to emphasize the values of institutional training.

The report of Little and Johnson (32) of cases paroled from the Laconia State School at Laconia, New Hampshire, improves the argument that satisfactory adjustment is possible. There were 113 subjects in their study and they found that 80 per cent had adjusted successfully to community life. For 26 cases who were sterilized the percentage of adjustment ran somewhat higher: 87 per cent.

All of the studies thus far reviewed have added weight to the belief that satisfactory social adjustment is anything but impossible for a large percentage of mentally subnormal persons who are returned to communities from institutions. An investigation whose results were not so encouraging has been reported by Town and Hill (52). This is a study of 136 Erie County feeble-minded persons discharged from the Rome, New York, State School. Of the total group there were only 22 individuals who were successfully maintaining themselves financially at the time of the

investigation and had done so for periods varying from six months to fifteen years. Only eight individuals (six per cent of the total group) were able to meet the highest standards of adaptation to community life as set up by the study (52, p. 46). These standards were: (1) ability to support self, (2) ability to regulate life without financial or supervisory assistance, and (3) ability to live without infringing upon the law to the extent of arrest or commitment.

Dr. Edgar A. Doll, in a report published in 1931 (11), gave the results of a study of individuals paroled from Vineland State School, Vineland, New Jersey. His findings strengthen the belief that institutionally trained subnormals can be expected to adapt themselves to community life. Even the 42 cases dismissed against advice were able to show 57 per cent in the successfully adjusted class. Dr. Doll makes a statement in this report which has served as the inspiration for a number of other investigations of a somewhat different nature. This fact was referred to in Chapter I. His statement is as follows, "We are also in great need of information concerning the social adjustment of those feeble-minded who never reach the institution." Several of the studies to be reviewed in the next section refer to Dr. Doll's remark as being in part responsible for the investigation's having been made.

STUDIES OF NON-INSTITUTIONALIZED SUBNORMALS

One of the earliest studies of mentally deficient individuals not selected from institutional replacements

was reported by Kinder and Rutherford in 1927 (31). They investigated the social adjustment of 68 retarded children seen in the Henry Phipps Psychiatric Dispensary (Baltimore) in 1921. The intelligence quotients mentioned would tend to indicate a rather extensive range in this respect: half of the intelligence quotients were between 76 and 90 while eight were below 50. Over half of the total number of subjects were found in institutions or had been committed to institutions at some time. Since the investigators were particularly interested in the relationship between environment and adjustment, their conclusion in this connection is interesting: "Environment must be considered as an important contributing factor in any study of the social adaptation of retarded children" (31, p. 833).

In 1928, Thomas (50) published an employment history of 142 auxiliary school pupils between 16 and 21 years of age. This was for pupils of the Springfield, Massachusetts, school. The results pointed to short-term employment and a heavy turn-over. Eighty-eight boys had 211 jobs in less than five years and 54 girls had 178 jobs in the same period of time.

An investigation similar to that made by Thomas is reported by Hofman (27) for auxiliary school pupils in Stuttgart, Germany. In 1930 there were only 12 of a total of 150 who had stuck to the trade they had learned. Hofman's findings led him to conclude that industry offers the only place of work for pupils of the auxiliary school.

Dorothy Durling summarized data compiled by the Bureau of Mental Health in Pennsylvania with respect

to the employment records of individuals with low intelligence. Her study (14) shows that five per cent of those whose IQ's were below 40 had at some time procured gainful employment, while the best showing was for the upper intelligence level (IQ's from 60 to 70) of whom 72 per cent had had gainful employment. The percentage of those holding positions longer than one month was low, the 50 to 60 IQ group having the best record of 29 per cent. She also found that "70 per cent of the group for whom data were available made no more than ten dollars per week—less than a living wage."

Another study dealing with the question of employment is that of Keys and Nathan (30). Starting with an examination of 610 positions held by individuals who had formerly been enrolled in the ungraded classes of the San Francisco, California, Public Schools, they brought into their investigation pertinent data, taken from studies made elsewhere of a total of 2145 persons. Their findings thus involved 2755 individuals. Of the 2755 positions held by pupils from ungraded classes, only one in eight of those held by men rated above unskilled labor, and for the women only one in fourteen. That the graduates of ungraded classes do tend to fall into the lower employment brackets when they are able to secure work is one conclusion supported by the results of this study. That many such persons do become at least self-supporting is another fact borne out by the examination of the records, a fact which leads the writers to say, "That a large percentage, perhaps even a majority, of the pupils leaving our

public classes for the mentally deficient are capable of earning their own living, given reasonably favorable circumstances, is no longer open to question" (30, p. 509).

Lurie, Schlan, and Freiberg have reported an investigation (33) covering several phases of the social adjustment of 55 feeble-minded children over a period of eight years. They found 70 per cent gainfully employed. With regard to social adjustment in the more inclusive sense they report 60 per cent as being completely successful, 26.6 per cent as partially adjusted, and 16.4 per cent total failures.

In 1930 a committee working under the direction of May E. Bryne reported an investigation of post-school adjustments of pupils from the special classes in the Minneapolis Public Schools. There had been a total of 1573 pupils enrolled in these classes over a period of years and of these it was found possible to secure interviews with 337 individuals during this study. Practically 70 per cent of the boys and girls had employment at the time of the interviews. This was thought to compare very favorably with the amount of employment for boys and girls of high school and vocational high school training (4, p. 7). With respect to conduct it was found that fewer than one-fifth of the total number of cases had any record of court appearance.

In two related studies reported by Olin (37) and by Hay and Kappenburg (25) of 74 problem children who had been patients of child guidance clinics of Minneapolis and St. Paul, it was found that adjust-

ment for these subjects (they were still of compulsory school age) is most closely related to factors which reflect the children's emotional environment. Health and physical defect were also found to be significant in relation to adjustment.

Eileen Blackey studied the after-school adjustments of 50 special class graduates of a Massachusetts school system. These subjects had been out of school from one to three years. The principal conclusion is that "Desirable personality traits very definitely contributed to success; and, since economy sufficiency and favorable parental attitudes determine personality to a large extent, all three of these were judged to be vital factors in adjustment" (2, p. 178).

A "follow-up" of 100 mentally defective girls is reported in a recent study by Steckel (47). Employment histories show that 19 had found work outside the home. During the ten-year period after leaving school 29 were married, nine had had illegitimate children, 22 had been before probation officers and five had been committed to institutions for the feeble-minded. (These subjects had been in special classes in the Sioux City, Iowa, Public Schools.)

An effort "to determine and evaluate the social adjustment of a group of subnormal children examined at the Judge Baker Foundation (Boston) over a period of five and one-half years" is reported by Shimberg and Reichenberg (43). Their group of subjects numbered 103 boys and 86 girls. The investigators conclude that background factors such as heredity, home conditions, race, number of siblings, etc., had little to

do with success and failure. Good personality and success were found to be positively related to a significant degree. Of the 189 cases, 53 per cent had been definitely successful until at least 18 years of age, over a period of four years. Sixty-eight per cent of the group were found to be self-supporting, while 11 per cent were partially self-supporting. Sixty-six per cent of the cases with good supervision showed successful adjustment.

Different, in several important respects, from the studies referred to above is one by Ruth E. Fairbanks (15) consisting of a "follow-up" of subnormal children and a control group of normals in the school population of the Locust Point District of Baltimore. Because this study, in its purpose and in the procedure adopted, bears some close resemblances to the investigation which will be set forth in the following chapters, it will be reviewed in greater detail and will be referred to for comparison, at several points in later sections of this thesis.

The subjects for this study were fairly homogeneous with respect to nationality (largely German, Polish, and Hungarian in extraction and speech) and were unusually bound together by the ties of community interest. The 166 subnormals were so designated by examinations conducted in connection with a school survey in 1914. Other criteria besides mental test ratings were used, and on the mental tests the average IQ was 72, the *Huey revision of the Binet-Simon* being employed. After a lapse of more than ten years it was possible to visit, and report on, 122 individuals of the

original group of those classified as subnormal.

From the social service exchange files it was learned that 92 of the 122 cases had never been listed with agencies. Forty-seven of the men were self-supporting and 11 others married women who contributed to the family budget. There were 37 of the women who were not dependent upon outside aid. Of 22 subjects who, in 1914, were said to have no prospect of future self-support at least eight were self-supporting. There were 17 of the men and 20 of the women who owned or were buying their homes.

The subnormals had made about three times as many police court and juvenile court appearances as had the normal controls, there being 31 of the former and 10 of the latter who were listed.

This report gives a particularly bright picture of the prospects for successful social adjustment on the part of individuals who, in school, may be classified as mentally subnormal. A final appraisal of the findings summarized in this chapter would seem to warrant the judgment that many persons of subnormal intelligence can be successfully adjusted to community life although local conditions of many kinds will alter results, and such factors as previous training and present supervision are important.

III

THE PLAN OF THE PRESENT STUDY AND THE PROCEDURE EMPLOYED

Dr. Doll's statement (12) regarding the need for information relative to the social adjustment of mentally subnormal individuals who do not come under the supervision of institutions led the writer to inquire into the possibility of conducting an investigation into the after-school careers of a group of opportunity-room children whose clinical diagnoses indicated that they were definitely deficient in mentality.

The particular group of individuals selected for this study came from the special classes organized as part of the public school system of Lincoln, Nebraska. The fact that the records of the opportunity rooms in the Lincoln Schools date back to 1916¹ and that the school psychologist has had charge of classifying retarded children since that date seemed to insure that a number of individuals of definitely subnormal intelligence and of relatively long after-school careers could be selected for study.

¹The first opportunity room was organized by Miss Clara Slade in the fall of 1916, and in 1920 the psychological clinic was opened. From the beginning this work has been under the capable direction of Miss Clara Slade. Her training at Vineland and her study under such persons as Dr. H. H. Goddard strengthen the belief that the diagnoses made in her clinic may be considered reliable (within the limits claimed by competent clinicians for such diagnoses).

THE SPECIFIC PROBLEMS TO BE INVESTIGATED

The plan of this study called for a detailed "follow-up" of all the subjects chosen for the investigation, with information to be gathered along the following main lines of inquiry.

1. The aspects of home background which particularly characterize these individuals.
2. The kind and amount of schooling.
3. The physical health of the subjects.
4. Marital status.
5. The extent to which the subjects have been successful in regulating their conduct so as to conform to the laws and social customs of the community.
6. Occupational choices and permanence of employment.
7. The degree of economic self-sufficiency or dependence.
8. The effects of the depression on individuals of retarded intelligence.
9. The respects in which mentally subnormal individuals who succeed in making a reasonably satisfactory social adjustment differ from those who fail.

These nine inquiries constitute the principal lines along which this investigation was actually conducted. A number of other questions were included in the original data sheets but they were more or less incidental to the main purpose of the study.

The data sheet which was followed as a guide in compiling individual records is shown in Appendix A.

THE SELECTION OF SUBJECTS FOR THE INVESTIGATION

An examination of the records of the opportunity rooms (or special rooms) revealed that there had been in these classes about 225 pupils who would now be more than 21 years of age. Of these 225 there were several whose handicap appeared to be lack of facility in the use of the English language; several more were probably disciplinary cases rather than instances of mental deficiency; a few others were in school for such a short time that it was felt unwise to include them, in view of the slightly greater uncertainty which this introduces regarding their proper classification.

As one means of insuring the selection of individuals of deficient mentality it was decided to include no pupil whose IQ (measured with individual intelligence tests) was above 70. It was recognized that this represented a very arbitrary standard and that some individuals with higher IQ's might actually be more definitely feeble-minded than a few of those selected. However, it happened that the imposing of this arbitrary standard excluded (of itself) only five individuals of the 225. It may be added here, parenthetically, that intelligence quotients constituted only one of a number of criteria which were used to determine the original assignment of pupils to special classes for mentally deficient children.

Most of these individuals were tested with the Stanford Revision of the Binet-Simon Tests. A few were tested with the Goddard Revision and about a dozen were given both tests.

When the selection of names was finally completed there were 206 individuals designated for follow-up investigation. Of these, 126 were males and 80 were females. Additional information relative to their average age at the time of the study and the average of the intelligence quotients is given in Table 1.

TABLE 1
THE MEAN AGES AND INTELLIGENCE QUOTIENTS OF SUBNORMAL
AND CONTROL SUBJECTS*

Age and intelligence quotients	Subnormal subjects		Control subjects	
	Male	Female	Male	Female
Mean age in months	326.00	328.25	325.72	322.40
SD's of the age in months	29.84	30.92	31.18	29.60
Mean intelligence quotients	60.50	59.00	107.84	105.92
SD's of intelligence quotients	7.78	8.25	4.92	4.82

*The age of subjects is here computed to May 1, 1935. IQ's are those given in the original (opportunity room) examinations.

To summarize the conditions which determined the selection of individuals for the investigation it may be said that the subjects were those (1) whose clinical examinations indicated definitely subnormal mentality, (2) who had had one or more years in the opportunity-room classes, (3) whose intelligence quotients did not exceed 70, and (4) whose ages at the time of the study were more than 21 years.

THE SELECTION OF CONTROL SUBJECTS

For the purpose of establishing a standard of achievement, or adjustment, which might guide in the appraisal of the success or failure of the 206 subnormal subjects it was decided to conduct a "follow-up"

of the same number of mentally normal individuals. The latter were selected in the following manner.

1. Each one must agree in sex, nationality, and age (to within 18 months) with the subnormal individual with whom he was to be paired.

2. Their mental test scores must have yielded IQ's between 100 and 120 on the Terman Group Test of Mental Ability. If scores on other tests were also available, they had to conform to this range or the subjects were excluded.

3. To insure a truly impartial selection of controls, the records of over 20,000 students were drawn, in succession, from the files, and, when any one of these individuals agreed with a subnormal in sex, age, and nationality (or race) and met the mental test condition stated above, his name and that of the subnormal were paired. This process was continued until opposite the name of each subnormal there was placed the name of a control subject.

There were two reasons for choosing control subjects from the records of the Terman Group Test. In the first place, individual tests of intelligence were not available, generally, for the normal subjects and where they had been given there was occasionally a problem of discipline or of other unusual circumstances involved. In the second place, the Terman Group Test had been given to a much larger number of students than any other test and would offer a better sampling of the school population.

The selection of a range of IQ's from 100 to 120 is admittedly higher than would have been necessary to

assure "normal" intelligence. It was decided to use this distribution, however, in order to preclude any possible question of overlapping of the ranges of mental abilities of the two groups.

THE STEPS IN THE "FOLLOW-UP" PROCEDURE

With the two groups of subjects selected for the investigation, the work of gathering information about them began. This task consisted of two parts. In one part it was proposed to make personal contacts with as many of the subjects as possible, while the other part of the study called for the examination of pertinent records of all institutions to whom the subjects had been known.

Before making any effort to learn the present addresses of the subjects the records of the Child Welfare

TABLE 2
RACE AND NATIONALITY OF THE SUBJECTS

Race and nationality	Subnormal subjects		Control subjects	
	Male	Female	Male	Female
White children of American-born, English-speaking parents	89	58	89	58
Negro children (American-born parents)	4	3	4	3
Children of German-Russian parentage*	24	11	24	11
Children of German parentage	4	4	4	4
Children of Bohemian parentage	3	1	3	1
Children of Jewish parentage	1	1	1	1
Children of Italian parentage	1	2	1	2
Total number of subjects	126	80	126	80

*These parents, as well as those of German, Bohemian, Jewish, and Italian children, generally are foreign-born, but speak some English. The children all speak English with varying degrees of facility.

Bureau of the Lincoln Public Schools were examined for the information that they would yield. This was a very important and decidedly helpful source of data for the reason that all minors, as long as they are in the city, are listed with the Bureau.

Information relative to the names and occupations of the parents, their places of birth, their nationality, and their different residences in the city was available up to the twenty-first birthday of the subject or until the subject moved out of the city. The employment record of the subject was given for this same period as well as a summary of his school attendance.

In a number of cases it was possible to trace subjects to their present addresses by making inquiries in the neighborhood of the last street and house numbers given in the records of the Bureau or by "unravelling" relationships-by-marriage as revealed by these records.

The next step in the "follow-up" was to look for the names of the subjects in the city directory and the telephone directory. When names did not appear in these directories and could not be found by following the plan indicated in the paragraphs above, the task of finding the subjects became a matter of submitting the names to various agencies and inquiring from former employers, ministers, and others in the hope of gaining new "leads."²

²By actual count the writer finds that it took 318 different "leads" to locate the 196 subnormal subjects whose present locations are known. In one case after 15 separate and distinct "leads" a subject was located.

When present addresses had been secured for the subjects an attempt was made to interview each one. The purpose of these interviews was (1) to gain impressions about the subjects' relatives, living conditions, neighborhood, and similar circumstances which might not be possible through any other sources of information, (2) to get the most recent data pertaining to marriage, size of families, occupations, and so on (recognizing that these data must then be verified in many instances), and (3) to have the satisfaction of knowing the individuals who were the subjects of one's study.

The fourth step was to clear the subjects' names with the Social Service Exchange. (In at least two dozen cases the names were submitted to the Exchange before present locations were known, partly in the hope of getting clues to addresses.)³ This prepared the way for the examination of the records of social welfare and relief agencies where different ones of the subjects were known.

Police court records, penitentiary and reform school commitments, and residence in institutions for the feeble-minded and in asylums were investigated in turn, as well as the histories of individuals who had

³It would be quite impossible to estimate the savings in time and labor which the service of the Exchange renders both for the investigator and the agencies whose records were referred to, but anyone who has attempted a similar study will agree that the saving is great, and the more compact picture which this clearance gives of the references is also of inestimable value. The Social Service Exchange is maintained by the Community Chest and the Council of Social Agencies, and serves as an index to the case records of public and private agencies; it is set up by these agencies themselves as a clearing house for information in their files.

been charges of the State Home for Dependent Children. Where it was impossible to get reliable information about subjects who had moved away by consulting acquaintances and relatives in Lincoln, the necessary data could generally be secured by directing inquiries to county officials or to other responsible persons in the neighborhood to which the subjects had moved.

Altogether there were 33 agencies and institutions which were contacted in acquiring the information reported in the next chapter and, in addition, interviews were held with several case workers whose assignments gave them special acquaintance with certain of the subjects.

IV

THE DATA PERTAINING TO THE SOCIAL ADJUSTMENT OF MENTALLY DEFICIENT INDIVIDUALS

It will be the purpose of this chapter to set forth the findings relative to eight of the nine principal inquiries which constituted the major part of the present study. These nine inquiries as enumerated in Chapter III, had to do with (1) home background, (2) education, (3) health, (4) marital status, (5) stability of character, (6) occupations, (7) economic status, (8) the effect of the depression upon the mentally subnormal, and (9) differentiating characteristics of the successfully adjusted subnormals. After some preliminary remarks concerning the present locations of the subjects, the data pertaining to the first eight of these several aspects of the investigation will be presented and considered in the order of their enumeration above. The ninth inquiry mentioned will be taken up in a separate chapter.

PRESENT LOCATIONS OF THE SUBJECTS

Of the 206 subnormal and 206 control subjects it was possible to learn the present whereabouts of 196 of the former and 202 of the latter and secure reasonably complete information about them. The writer is inclined to think (as a result of the experience in trying to locate these subjects) that a rather important part of

such studies as this is bound up in the question of the status of those individuals who are most difficult to locate. Obviously a number of circumstances may account for the difficulty in contacting them, but there are reasons for supposing that the explanations behind these almost complete disappearances would add significant details to the final report. The writer feels quite fortunate, however, in being able to get in touch with 95 per cent of the subnormal group and 98 per cent of the control subjects. The experience of others in similar "follow-up" studies suggests that this is a high percentage of locations.

Table 3 gives a summary of the locations of the 412 individuals who were the subjects of this investigation.

Several facts of some significance are apparent from an examination of this table.

A comparison of the number of individuals in institutions with Dr. Doll's estimate of the number in *institutions for the total feeble-minded population* (12) shows a rather close agreement. Dr. Doll judged that less than ten per cent of all feeble-minded persons ever reach our public institutions. Of the 196 subnormals who were located in the present investigation somewhat less than seven per cent are now in institutions for the feeble-minded. However, if those who have been paroled and those who have died in the institutions for the feeble-minded are added to the number of those still confined, the percentage goes up to 11.22. There are five individuals who have been paroled from institutions for the feeble-minded and four others who died while residents there.

TABLE 3
A SUMMARY OF THE LOCATIONS OF SUBNORMAL AND CONTROL
SUBJECTS

	Male		Female		Both sexes	
	N	%	N	%	N	%
Subnormal subjects						
Total number of subjects	126	100.00	80	100.00	206	100.00
Number of subjects located	123	98.41	73	91.25	196	95.15
Locations*						
Deceased	10	8.13	4	5.49	14	7.14
Institutions for feeble-mindedness	5	4.07	8	10.96	13	6.65
Hospitals for the insane	1	.81	0		1	.51
State reformatory	0		1	1.37	1	.51
County jail	1	.81	0		1	.51
Living in Lincoln	73	59.35	43	58.90	116	59.18
Living in Nebraska, outside of Lincoln	17	13.83	9	12.32	26	13.25
Moved to other states	16	13.00	8	10.96	24	12.25
Total number accounted for	123	100.00	73	100.00	196	100.00
Control subjects						
Total number of subjects	126	100.00	80	100.00	206	100.00
Number of subjects located	124	98.41	78	97.50	202	98.06
Locations*						
Deceased	1	.81	1	1.28	2	.99
Institutions for feeble-mindedness	0		0		0	
Hospitals for the insane	0		1	1.28	1	.50
State reformatory	0		0		0	
County jail	0		0		0	
Living in Lincoln	68	54.84	43	55.13	111	54.95
Living in Nebraska, outside of Lincoln	26	20.97	15	19.23	41	20.29
Moved to other states	29	23.38	18	23.08	47	23.27
Total number accounted for	124	100.00	78	100.00	202	100.00

*All percentages recorded below the word "locations" are computed on the basis of the number of subjects located.

If one construes the reference to public institutions to include reformatories as well as asylums for the insane and institutions for the feeble-minded, the figures for total commitments in the present study run quite a little higher than Dr. Doll's estimate—approximately double the percentage given in the paragraph above.

It is doubtful, however, if this way of representing the situation illustrates the point that Dr. Doll had reference to, in which case the 11 per cent mentioned above is a fairer basis of comparison.

Another question about which the data of Table 3 offer some information is that regarding the migratory tendencies of the mentally subnormal. It is evident that they do not move away to the extent that the mentally normal do. The percentage of the latter who have moved to other states is virtually double the percentage of the subnormals who now live outside of Nebraska. The number of individuals living in Nebraska outside the city of Lincoln also shows a difference in favor of the control subjects—20 per cent against somewhat less than 14 per cent. These figures are in marked contrast to the respective moving habits of these two groups within the limits of a given community. The 116 subnormals who are now in Lincoln have moved approximately 210 times in the last three years while, in the same 36 months, the 111 control subjects, now living in Lincoln, have moved 75 times. Another way of stating this comparison is to say that the 116 subnormals have had 248 residences in the same period of time in which the 111 controls have had 121 residences. This last statement refers to the number of residences when the subjects who did not move at all are added. There were 38 subnormals and 46 controls whose residence remained fixed during these three years.

THE PROBLEM OF HOME BACKGROUND

It is the purpose of this section simply to present a few facts which may have the value of supplementing the results of more intensive studies in this specific field. To examine into the influence of home life upon the careers of subnormal boys and girls is a major enterprise in itself; the data submitted below are offered as a contribution to certain aspects of a gradually accumulating fund of information.

Into the complexity of factors which constitute the problem of "home background" is interwoven the effect of the economic status of the family, of the regularity of employment and the kind of employment of the parents, of the size of the family, and of the permanence of residence. The influences of exposure resulting from poor housing and poor clothing, of undernourishment, of inadequate medical attention, and of neglect on the part of incompetent parents—these conditions and many more would need to be investigated if an adequate analysis of home background were to be gained. Tables 4 and 5 furnish data pertaining to several of these factors under the headings of the economic status and the social security of the homes from which the subjects came.

In Table 4 a rather arbitrary classification of occupations is given for the purpose of showing how the two groups of subjects are represented in each class. Some of the occupations may seem to be questionably located in this scheme, but the knowledge which the writer has of the particular cases involved is the basis for the departure from the customary classification.

TABLE 4
OCCUPATIONAL DISTRIBUTION OF SUBJECTS' PARENTS

Occupations	Subnormals		Controls		Occupations	Subnormals		Controls	
	M	F	M	F		M	F	M	F
Editor	0	0	3	1	Baker	1	0	1	1
Lawyer	0	0	4	1	Barber	0	0	1	1
Minister	0	0	0	3	Carpenter	9	2	5	1
Physician	1	1	0	1	Clerk	0	1	8	5
Total	1	1	7	6	Fireman	3	1	2	2
Accountant	0	0	4	0	Manager: Cafe	0	0	1	2
Contractor	0	0	5	1	Mason	1	2	3	0
Druggist	0	0	2	2	Mechanic	5	2	9	5
Florist	0	0	2	1	Motorman	1	1	0	1
Hotel manager	0	0	1	0	Paper hanger	1	2	0	1
Owner:					Plumber	0	2	0	0
Clothing store	0	0	2	1	Policeman	0	0	0	1
Iron works	0	0	1	0	Tenant farmer	2	1	0	0
Laundry	0	0	2	1	Total	23	14	30	20
Lumber com- pany	0	0	2	1	Common labor	49	28	16	5
Public school teacher	0	0	5	3	Cook	2	0	0	3
Sales manager	0	0	3	2	Domestic	6	13	1	2
Violin maker	1	0	0	0	Farm hand	8	3	1	2
Total	1	0	29	12	Janitor	5	0	3	3
Bank clerk	2	0	2	0	Shoe maker	2	0	0	0
Electrician	2	2	2	1	Truck driver	8	1	1	1
Farm owner	4	1	6	8	Total	80	45	21	14
Grocer	1	1	4	3	Occupation unknown	4	5		
Mail clerk	0	1	2	2	Total	123	73	124	78
Nurse	0	0	4	0					
Printer	1	0	7	2					
R. R. engineer	1	0	2	2					
R. R. foreman	2	2	3	1					
Salesman	1	1	5	7					
Total	14	8	37	26					

Groupings of this sort are arbitrary enough at best when one considers the variability of success among persons of any given occupation, but the general picture which this kind of scheme presents does tell a story. From Table 4 it is evident that the subnormal subjects came pretty largely from the lower occupational levels with virtually no representation in the higher professions.

Table 5 is an attempt to summarize another phase of family background. Factors which contribute to insecurity and influence of an antisocial nature are listed in this table. Admittedly, the effect of separation of parents and of the death of one of them or of both parents may be quite different in different cases, but

TABLE 5
FAMILY BACKGROUND OF SUBNORMAL AND OF CONTROL SUBJECTS

Circumstances of background	Subnormals		Controls	
	M	F	M	F
Individuals with one parent deceased	32	18	23	18
Individuals with both parents deceased	8	1	3	4
Parents divorced	14	15	7	4
Families listed with relief agencies before subject's twenty-first birthday	23	15	2	3
Both parents with major criminal records (penitentiary or long jail sentence)	2	1		
One parent with major criminal record	5	1		
Parents with disorderly conduct records: prostitution, petty thievery, drunkenness, and so forth	17	18	2	4

the data of Table 5 do indicate some rather marked contrasts. The reference to forms of disorderly conduct may be analyzed in two different ways: that the subnormals are surrounded by a greater amount of such influence is plain; that the figures do not run higher in these categories may be equally significant.

The question of family size is one which often comes up in discussions about persons of subnormal intelligence. In the present study it was possible to get information concerning the number of children in the homes of 180 of the mentally deficient subjects and 165 of the controls. Table 7 shows the degree of significance in the difference in the average number of sib-

TABLE 6
THE NUMBER OF SIBLINGS OF THE SUBNORMAL AND THE CONTROL SUBJECTS

	Subnormal subjects						Control subjects					
	Male			Female			Male			Female		
	B	S	Both sexes	B	S	Both sexes	B	S	Both sexes	B	S	Both sexes
No. of brothers and sisters	222	176	398	141	130	271	165	145	310	116	102	218
Total number of siblings	398			271			310			218		
Mean number of brothers and sisters	2.09	1.66	1.87	1.90	1.75	1.82	1.61	1.42	1.51	1.84	1.62	1.70
Mean number of siblings	3.78			3.66			3.04			3.46		
Number of subjects for whom data were available	106			74			102			63		

TABLE 7
THE SIGNIFICANCE OF DIFFERENCES IN THE NUMBER OF SIBLINGS

	No. of subjects	Mean no. of siblings	S.D.	Difference	$\frac{D}{\sigma_{diff.}}$
Subnormal subjects	180	3.72	2.58	.54	2.46
Control subjects	165	3.18	2.46		

lings of the two groups. While the difference is not perfectly reliable, it is obviously large enough to substantiate the prevailing opinion that more children are born to parents of poorer mental endowment.

THE EDUCATIONAL ACHIEVEMENTS OF THE MENTALLY SUBNORMAL

When an individual's clinical examination indicates a decided mental deficiency, it is not to be expected that he will advance far in school. On the contrary, it is deserving of consideration if any number of such individuals do exceed their early prognoses in this respect. The following table, Table 8, should be interpreted with the opportunity-room history and the low intelligence rating of the subnormals in mind.

Several points may be noted relative to the data in Table 8. Since the work of the opportunity room covered a range of about three grades at the time these subjects were in school, the fourth grade is the one listed next to the opportunity room. If the work of the opportunity room is figured into the computation as of second-grade caliber (the average of the first three grades), the mean for both the subnormal boys and the

TABLE 8
THE EDUCATIONAL ACHIEVEMENT OF SUBNORMAL AND OF CONTROL SUBJECTS

Last grade completed	Subnormals		Controls	
	Males	Females	Males	Females
Opportunity room	51	31		
Fourth grade	12	7		
Fifth grade	11	11		
Sixth grade	11	5		
Seventh grade	5	8		
Eighth grade	11	2		
Ninth grade	3	2	4	4
Tenth grade	7	2	10	7
Eleventh grade	1	2	16	9
Twelfth grade	1		22	20
Special training beyond high school	1	2	6	5
First year of college			16	7
Second year of college			6	11
Third year of college			14	4
College graduation			25	9
M.A. degree			3	0
M.D. degree			1	0
Ph.D. degree			1	0
Mean grade completed	4.45	4.30	13.36	12.56
S.D. of grade distribution	2.81	2.90	2.68	2.40
Number for whom grades are available	113	72	124	76

girls is slightly below four and one-half grades. What is probably more significant is the fact that 23 boys and 10 girls completed eight grades of work and that one boy and two girls finished high school. It should be mentioned in this connection, however, that in a number of cases the work taken by those individuals who got as far as the junior high school was of a special type.

It is interesting to examine the records of those pupils who continued in school beyond the eighth grade. In all but four cases they were from English-speaking families, which refutes the idea that mistakes in mental diagnoses of children with language handi-

caps (who might later overcome this handicap) accounts for individuals' surpassing their earlier prognoses. The pupil who reached the highest grade (most of one year in college) established a reputation for persistence in her desire to "go to college." She was graduated from high school at the age of 22.

An analysis of the records of those pupils who greatly exceeded the average grade for the subnormals indicates that in most cases the factors of determination and of pride of achievement were more potent for success than mental ability. The age of the subjects when they reached these relatively higher grades and the length of time some of them spent at the task contribute to this belief.

THE PROBLEM OF VITALITY

It is not the intention here to go into any detail in the discussion of the matter of vitality pertaining to the subnormal subjects. It is of some consequence, however, to note that slightly more than seven per cent of the mentally deficient subjects have died (see Table 3) as compared with one per cent of the controls. However, the death rate for the subnormal group, when considered for any given year, does not differ greatly from the figures given in the reports of Dayton (9) and Martz (34). The former found the death rate five times greater for idiots than for the general population; for imbeciles it was from two to two and one-half times that for the general population, and for morons practically the same as for the population in general.

Martz, in a study of 1273 patients in an Ohio institution for the mentally deficient, found the mean death rate to be 32.2 per 1000. He also found tuberculosis to be a major factor in the death of the mentally subnormal, with which statement the findings of the present study agree. Evidence on this point, for the present investigation, is not complete, but the writer found that at least one-third of the deaths were due to tuberculosis. Six other individuals of the subnormal group are known to be tubercular.

MARITAL STATUS

The number of individuals married, the number of children, and the average age at marriage are shown in Table 9. The fact that the girls of the subnormal group have married in a much larger percentage of cases than the boys rather lends support to the assertion

TABLE 9
THE MARITAL STATUS OF SUBNORMAL AND OF CONTROL SUBJECTS

Marital circumstances	Subnormal subjects			Control subjects		
	Male	Female	Both sexes	Male	Female	Both sexes
Number married	41	43	84	65	46	111
Percentage married	33.33	58.89	42.86	52.42	58.96	54.95
Number divorced	2	6	8	5	5	10
Percentage divorced	1.62	8.22	4.08	4.04	6.41	4.95
Total number of children	52	59	111	46	47	93
Mean number of children for persons married	1.27	1.37	1.32	.71	1.02	.84
S.D.'s of the number of children	1.19	1.36	1.30	.78	1.51	1.13
Mean age (in years) at marriage	23.28	19.94	21.88	23.55	21.75	23.46
S.D.'s of marriage age distribution	2.40	2.59	2.50	2.94	2.88	2.92

made by several investigators in this field that the girls marry to secure economic support while the men do not marry on account of the same economic factor. At any rate, the difference of 33 per cent for the boys against 59 per cent for the girls is marked. It is interesting that virtually the same percentage of girls from the normal group and from the subnormal group have married.

The tendency toward larger families in the case of the subnormals, which was noted in the comparison of the number of siblings, is shown again in the average number of children in the families of the subnormal and control subjects. The significance of the difference is brought out in Table 10.

TABLE 10
THE DIFFERENCE IN AVERAGE NUMBER OF CHILDREN OF SUB-NORMAL AND OF CONTROL SUBJECTS

Persons considered	N	Mean number of children	S.D.	Difference	<i>D</i>
					<i>σ_{diff.}</i>
Subnormal subjects	84	1.32	1.30	.48	2.82
Control subjects	65	.84	1.13		

Another difference which is shown to be significant is that between the average age at marriage of the females of the two groups. Table 11 is constructed to

TABLE 11
THE DIFFERENCE IN AVERAGE AGE AT MARRIAGE OF THE FEMALE SUBNORMAL AND CONTROL SUBJECTS

Persons considered	N	Mean age at marriage	S.D.	Difference	<i>D</i>
					<i>σ_{diff.}</i>
Subnormal subjects	43	19.94	2.59	1.81	3.17
Control subjects	46	21.75	2.88		

show this difference. It may be noted that with regard to average age at marriage the males of the two groups show very little difference.

THE STABILITY OF CHARACTER IN MENTALLY SUB-NORMAL INDIVIDUALS

The question which is central in the examination of the conduct records of the subjects of this study pertains to the relative success or failure of these individuals in their attempts to make their lives conform to the laws and to the accepted social standards of their respective communities. It is possible to take two different methods of interpreting the data bearing on this question. A person may emphasize the striking difference between subnormals and controls in regard to records of misconduct or, on the other hand, the fact that the extent of misconduct is not greater, considering the handicaps imposed upon the subnormals, may be judged most significant. The interpretation of these data, however, will be left to the last chapter. Table 12 presents the results of the investigation of this problem.

In this table the figures dealing with juvenile court records, with jail terms, and reformatory and penitentiary commitments are thought to be complete and reliable. The summary of police court records demands a word of explanation, however. In Table 12 only the cases of relatively serious offenses are included. Wife desertion, destruction of property, driving while intoxicated, assault and battery: these are typical of the

TABLE 12
THE CONDUCT RECORDS OF MENTALLY DEFICIENT AND OF CONTROL SUBJECTS

	Subnormal subjects						Control subjects					
	Male		Female		Both sexes		Male		Female		Both sexes	
	N	%	N	%	N	%	N	%	N	%	N	%
Juvenile court	32	26.02	17	23.28	49	25.00	6	4.84	2	2.56	8	3.96
Police court	31	25.21	4	5.48	35	17.86	12	9.67	1	1.23	13	6.43
City and county jail	17	13.82	1	1.37	18	9.18	3	2.42	0		3	1.43
Reformatory commitment	11	8.92	5	6.85	16	8.16	1	.81	2	2.56	3	1.43
Penitentiary	2	1.63	1	1.37	3	1.53	0		0		0	

charges included. Violation of traffic ordinances and minor disturbances of the peace are omitted. Arrest for speeding is a charge which, if included, would have doubled the figure for the court appearance of the control subjects.

A question which is often raised in discussions of the conduct of mentally deficient individuals is whether they are more inclined to promiscuous sex relations than are persons of average intelligence. The writer recognizes the importance of this question but doubts the reliability of data available for comparisons of the two groups of subjects in this study.

It would be possible to state rather accurately the number of mentally deficient women (of this study) who have been, or still are, considered sexually promiscuous, but similar data for the women of average intelligence are apt to be misleading: those cases which have come before the juvenile courts and to the attention of

social welfare workers may fail to represent the total amount of sex misconduct with this group in the way that court records and welfare records tell the story of the subnormal subjects.

In connection with the problem of securing dependable data relative to illicit sex relations, illegitimate births, and venereal disease, it may be stated that the most reliable records of such information are, by law, not open to examination in this state. Those referred to are the records of the city clinic. (Obviously there are excellent reasons for this law.)

If one were to take the data from those records which are available (school, welfare agencies, and court records), the figures, with respect to promiscuous sex relations leading to investigation by authorities, would show 18 subnormal women and four of the controls. There is no case in either group where there is clear evidence of prostitution's being followed as a means of financial support.

The writer wishes again to emphasize the point that he offers the statements above as quite tentative in the case of the female control subjects and not thoroughly satisfactory evidence in the case of the mentally deficient women.

RECORDS OF EMPLOYMENT OF THE MENTALLY DEFICIENT SUBJECTS

An examination of the employment histories of the 107 subnormal males who are now living (excluding the six who are confined in institutions) reveals that

12 have held (and do now hold) jobs at which they have been employed for more than a year. Two of these are farm hands, two are drivers of delivery wagons, two are mechanics, one is a barber, one is a cabinet maker, one is a lens grinder, one is a tire repairman, and two are janitors. Three other individuals are in the army and another is in the navy. Still another individual is a professional boxer and independently self-supporting. These 17 men whose occupations have been of a relatively permanent nature constitute 15 per cent of the total number of males, now living, who were located.

There were 18 other males who have held jobs for periods of time ranging from six months to one year. Those whose employment has generally been for periods of three months up to six months (average about four months) number 27 men. There are 38 males who have never been able to get beyond the "odd job" type of employment where their assignments are for a few days or for a very few weeks at most. Seven subnormal males are virtually unemployable. (This does not include the six who are now in institutions.)

An analysis of the occupational records of the 60 mentally deficient females who are now living outside of institutions shows that 16 are employed, or have husbands who are employed, in jobs that have been relatively permanent. Of these 16 there are 13 who are married. In the group of those whose employment has been for periods of six months to a year there are 12 married women and three who are unmarried. There are 18 married women and three unmarried

women who belong to the class where employment is highly unstable. The remaining eight females (of the 60 mentioned above) are altogether dependent upon relatives for their support. That the married females have a marked advantage over the unmarried females with regard to occupational status is indicated in Table 13. They have this advantage over the males also.

TABLE 13
OCCUPATIONAL STATUS OF THE SUBNORMAL SUBJECTS

Occupational status	Male				Female			
	Married N	Unmarried %	Married N	Unmarried %	Married N	Unmarried %	Married N	Unmarried %
Unemployable	0		7	10.61	0		8	47.05
Employment lasting less than six months	24	58.66	41	62.13	18	41.86	3	17.65
Employment lasting from six months to one year	9	21.95	9	13.63	12	27.91	3	17.65
Relatively permanent employment	8	19.39	9	13.63	13	30.23	3	17.65
Total number reported	41	100.00	66	100.00	43	100.00	17	100.00

For purposes of comparison an analysis of the occupational status of the control subjects is given in Table 14.

TABLE 14
OCCUPATIONAL STATUS OF THE CONTROL SUBJECTS

Occupational status	Male				Female			
	Married N	Unmarried %	Married N	Unmarried %	Married N	Unmarried %	Married N	Unmarried %
Unemployable	0		0		0		0	
Employment lasting less than six months	6	9.23	4	6.78	4	8.68	1	3.13
Employment lasting from six months to one year	25	38.46	20	33.90	17	36.96	12	37.50
Relatively permanent employment	34	52.31	35	59.32	25	54.36	19	59.37
Total number reported	65	100.00	59	100.00	46	100.00	32	100.00

In Tables 15 and 16 are presented lists of the types of occupations at which the subnormal and control subjects, respectively, are now employed. It is interesting to compare these lists with similar data given by

TABLE 15
PRESENT OCCUPATIONS OF THE MENTALLY DEFICIENT SUBJECTS

Types of occupations	Male	Female
Army and navy	4	
Baker	4	
Beauty operator		3
Boxing	2	
Cabinet making	1	
Car washing	2	
Dish washing	1	
Driving, delivery wagons	2	
Entertainer (tap dancing)	1	
Farm work	11	
Garbage collecting	3	
Housekeeping		42
Janitor service	3	
Labor: "Odd jobs"	38	
Labor: Railway yards, paving, and so on	16	
Lens grinder	1	
Maid		6
Mechanic	7	
Police patrol	1	
Store clerk		1
Tire repairing	1	
Trucking (drivers)	2	
Number having occupations	100	52
Number of unemployables	7	8
Total cases reported	107	60

Fairbanks (15) in her study of Locust Point residents. Railway shops and farm work predominate in the present study of occupations of mentally subnormal individuals, whereas shipyards and factories, as well as railway yards, furnished the greatest amount of work for Fairbanks' subjects.

TABLE 16
PRESENT OCCUPATIONS OF THE CONTROL SUBJECTS

Types of occupations	Male	Female
Army	3	
Bookkeeping	8	2
Business executive	6	
Chemist	6	
Cleaning and pressing	3	
Clerk (selling) in stores	10	13
Dairying	3	
Day labor (common)	19	
Delivery driving	2	
Dentist	2	
Druggist	2	
Engineer	3	
Farming	4	
Florist	1	
Forestration	1	
Geologist	1	
High school teaching	3	4
Hotel clerking	4	
Housekeeping		40
Janitor	4	
Lawyer	1	
Maid		3
Mechanic	4	
Medical doctor	2	
Musician	5	2
Newspaper manager	2	
Printer	4	
Reporter	3	
Stenographer		11
Student	8	
Station attendant	4	
Telephone operator		3
Travelling salesman	6	
Total number reported	124	78

THE DEGREE OF ECONOMIC INDEPENDENCE OF SUB-NORMAL AND OF CONTROL SUBJECTS

To supply information pertaining to the economic status of the subjects of this study the records of the several county and federal relief agencies were examined. In addition, it was possible in most cases to

supplement this information with reports from acquaintances and from employers.

TABLE 17
THE ECONOMIC STATUS OF MENTALLY DEFICIENT AND OF CONTROL SUBJECTS

Degree of economic independence	Male		Female		Both sexes	
	N	%	N	%	N	%
Subnormal subjects						
Confined in institutions	6	5.31	9	13.04	15	8.24
Totally dependent upon relatives	7	6.19	8	11.59	15	8.24
Partially self-supporting	72	63.71	31	44.93	103	56.59
Wholly self-supporting	28	24.79	21	30.44	49	26.93
Total number of subjects reported	113	100.00	69	100.00	182	100.00
Number of subjects aided by relief agencies	51	45.22	19	27.55	70	38.46
Control subjects						
Confined in institutions	0		1	1.32	1	.50
Totally dependent upon relatives	0		0		0	
Partially self-supporting	17	13.82	13	17.10	30	15.08
Wholly self-supporting	106	86.18	62	81.58	168	84.42
Total number of subjects reported	123	100.00	76	100.00	199	100.00
Number of subjects aided by relief agencies	15	12.19	16	21.05	31	15.58

It will be noted in Table 17 that approximately one-third as many subnormal subjects as control subjects are now self-supporting (in terms of percentage of subjects reported). When the number of individuals in institutions is added to the totals of those who have been on the rolls of relief agencies, the subnormals outnumber the control subjects by three to one. As might be expected, this last ratio does not tell the story completely, for the amount of relief given the mentally deficient group has been, per capita, much larger than the amount secured by control subjects.

In spite of these figures which indicate the far greater dependence of the subnormal subjects, there is, as mentioned before, a second way of appraising the data: that the mentally deficient are in 27 per cent of the cases wholly self-supporting is surely significant. That the female subjects enjoy an advantage over the males is evident from these figures, the difference being approximately the same as expressed in the permanence of employment data of Table 18.

TABLE 18
THE EFFECT OF THE DEPRESSION UPON THE ECONOMIC STATUS
OF SUBNORMAL AND CONTROL SUBJECTS

Circumstances of relief	Male		Female		Both sexes	
	N	%	N	%	N	%
Subnormal subjects						
Relief recipients before 1931*	18	16.08	11	17.44	29	16.57
Persons continuing on relief after January 1, 1931	17	15.88	10	16.66	27	16.17
Persons added to relief since January 1, 1931	34	31.78	9	14.94	43	25.75
Total relief recipients since January 1, 1931	51	47.66	19	31.54	70	41.91
Total number of subjects reported	107		60		167	
Control subjects						
Relief recipients before 1931*	4	3.23	7	8.97	11	5.34
Persons continuing on relief after January 1, 1931	2	1.61	7	8.97	9	4.54
Persons added to relief since January 1, 1931	13	10.57	9	11.88	22	11.05
Total relief recipients since January 1, 1931	15	12.19	16	21.12	31	15.53
Total number of subjects reported	123		76		199	

*Percentages for estimates before 1931 are based on 112 subnormal males, 63 subnormal females, 124 male controls, and 78 female controls; these were the numbers of the subjects living (omitting the inmates of institutions) in 1930.

THE EFFECT OF THE DEPRESSION UPON THE ECONOMIC STATUS OF THE MENTALLY SUBNORMAL

One respect in which the present study is in a position to contribute data not given in previous studies of this kind is that the effects of the depression upon the economic status of the subjects can be rather definitely determined. In several other studies it has been possible to deal in part with this factor—the investigations reaching a year or two into the depression—but a more complete account can be written at this date.

In Table 18 the relief situation for both the subnormal group and the control subjects is summarized. Perhaps the comparison between the two groups (which is the means of *interpreting* the effect of the depression upon the subnormals) may be most clearly stated in these terms: the relative dependency of the two groups before 1931 is given in a three to one ratio; in 1935 the ratio is about 2.7 to 1. The percentage of mentally deficient individuals *added* to relief rolls since January, 1931, is slightly more than double the percentage of mentally normal.

Two facts stand out from the data of Table 18. That the mentally deficient subjects have been added to the relief rolls in greater numbers than individuals of normal intelligence is apparent, but, on the other hand, the proportionate number of normals who have been forced to ask for relief is significantly larger.

The question of the characteristics which most clearly differentiate the better-adjusted subnormals from

those not so well adjusted constitutes an inquiry the findings of which belong to a separate discussion. Some of the data presented above in this chapter will have a direct bearing upon the problem of what factors contribute to the social success or failure of individuals of subnormal intelligence: the problem of the next chapter.

V

DIFFERENTIATING CHARACTERISTICS OF THE SUCCESSFULLY ADJUSTED SUBNORMAL SUBJECTS

It is quite impossible to analyze out all the factors which differentiate two such groups of individuals as the well-adjusted and the poorly adjusted persons of subnormal intelligence, but there are certain characteristics which can be compared, some of which are of more or less importance. It is the purpose of this chapter to contrast the 48 individuals who are best adjusted with the remainder of the subnormal group.

It happens that there are 48 mentally deficient subjects who qualify as well adjusted under the following standards of acceptable adjustment.

1. Wholly self-supporting.
2. Records clear of breaches of the law or of violations of accepted standards of ethics. (Minor offenses such as arrest for speeding are not charged against a subject's record.)

Of the 48 subjects who qualify under both of these standards there are 27 males and 21 females, or approximately 21 per cent of the total number of males located and 29 per cent of the females.

THE QUESTION OF AGE AS A DIFFERENTIATING FACTOR

The age of the well-adjusted subnormal individuals is somewhat greater than that of the remainder of the

subnormal group—an average difference of approximately nine months. However the $\sigma_{diff.}$ in this case is six months, which tends to dissipate any significance that might be attached to the age factor. The relationships found for the two groups as wholes persist when the comparisons are made for the men and for the women as separate groups.

TABLE 19
THE DIFFERENCE IN AGE BETWEEN WELL-ADJUSTED SUBNORMALS AND THOSE NOT SO WELL ADJUSTED

Subjects considered	N	Mean age in months	S.D.	Diff.	$\frac{D}{\sigma_{diff.}}$
Well-adjusted subnormals	48	333.58	36.80	8.98	1.32
Remainder of the subnormal group	134	324.60	32.30		

THE INTELLIGENCE QUOTIENT AS A POSSIBLE DIFFERENTIATING FACTOR

The question of differences in intelligence as expressed in IQ's leads to at least one finding of some interest. The difference between the mean IQ's for the well-adjusted men and for the remainder of the male group is statistically reliable (see Table 20),

TABLE 20
THE DIFFERENCE IN INTELLIGENCE QUOTIENTS BETWEEN TWO GROUPS OF MENTALLY DEFICIENT MEN

Subjects considered	N	Mean IQ	S.D.	Diff.	$\frac{D}{\sigma_{diff.}}$
Well-adjusted males	27	64.55	6.60	4.71	3.17
Remainder of the male group	86	59.84	7.38		

while the difference between the two groups of subnormal females is statistically quite unreliable (see

Table 21). Whether or not this indicates anything of

TABLE 21
THE DIFFERENCE IN INTELLIGENCE QUOTIENTS BETWEEN TWO
GROUPS OF MENTALLY DEFICIENT WOMEN

Subjects considered	N	Mean IQ	S.D.	Diff.	$\frac{D}{\sigma_{diff.}}$
Well-adjusted women	21	62.00	6.60	2.70	1.50
Remainder of the female group	48	59.30	8.31		

significance with respect to the importance of the difference in IQ in determining the success of the males, it at least shows that this factor is of very little consequence in the relative success of the two groups of females.

It is not the intention here to minimize the importance of the difference in intelligence quotients (in so far as it is truly indicative) between the better-adjusted males and the men who are not so well adjusted but there is reason to be cautious of *too much emphasis* upon this point. It is true that the statistically reliable difference exists; on the other hand, it is possible to match the frequencies of each interval in the distribution of intelligence quotients for the better-adjusted men with equal numbers of poorly adjusted men. In fact, the number of poorly adjusted men with IQ's from 65 to 70 is almost double the number from the ranks of the well-adjusted subjects. (The greater variability with the poorly adjusted group tends to offset the situation just mentioned and results in the lower mean.)

These facts at least raise difficulties in the way of

pointing to differences in IQ's as unequivocally differential with respect to the comparative success of the two groups of men.

MARRIAGE AS A FACTOR IN SOCIAL ADJUSTMENT

The number of marriages in the well-adjusted and not so well-adjusted groups is another factor which varies with the sex of the subjects. Of the 21 well-adjusted females there are 19 who are married as contrasted with but 12 married men among the 27 well-adjusted males. This percentage in the well-adjusted male group is somewhat larger (25 per cent larger) than with the less well-adjusted males. The difference is considerably more marked in the case of the two groups of women. These differences are shown in the following table.

TABLE 22
THE PREVALENCE OF MARRIAGE IN TWO GROUPS OF MENTALLY
SUBNORMAL SUBJECTS

Classification	Number of subjects	Number married	Percentage married
Well-adjusted males	27	12	44.44
Remainder of the male group	86	26	33.68
Well-adjusted females	21	19	90.48
Remainder of the female group	48	24	50.00

Another fact which is brought out in the examination of the records of the subnormal subjects who have married is the greater tendency among the women than among the men to improve their social status through marriage. The writer found that 18 of the 43 women who married (41.86 per cent) definitely gained more

economic security than they previously had and, in virtually every instance, married individuals of unmistakably better intelligence than their own (as evidenced by mental test records, school achievement, etc.). The next section will show that of these 18 women who improved their social status through marriage, 16 now belong to the "better-adjusted" class.

Only five of the women may be said definitely to have married "below" their former economic level. The remaining 20 women of the subnormal married group did not appreciably change their economic circumstances through marriage.

Corresponding data for the men show that seven of the 41 who married (17.07 per cent) may be said to have won mates whose mental ability was superior to their own (school marks and mental test scores taken as criteria). In five of these seven cases the men gained more economic security through marriage than they had previous to marriage. The remaining 28 men have married quite definitely within their own socioeconomic class.

THE RELATION OF DOMESTIC TRAINING TO SUCCESSFUL ADJUSTMENT IN WOMEN SUBJECTS

There are very few cases where any of the mentally subnormal women of this study have actually gone from favorable home surroundings to less favorable circumstances through marriage. The explanation in a number of cases is, of course, that it would be difficult to find surroundings inferior to those in the homes

from which the girls came. However, on the other hand, there are 16 individuals in this selection of well-adjusted women who definitely improved their economic circumstances by marriage. The other three of the group of 19 well-adjusted married women have not appreciably changed their conditions by marriage.

The fact that successful marriages have played a part in the better adjustment of 19 women leads to the question of whether or not there are factors which have given these individuals an advantage in gaining such marriages. Several circumstances are at least suggestive.

Seven of the 19 married women who are designated as "well adjusted" spent from two to six years each in the State Home for Dependent Children where a certain amount of training in domestic duties is given and from which institution girls are placed in homes (better than the homes from which they originally came) for work as maids and servants. Two others of these 19 girls had similar training in private institutions where they were placed by church organizations. Two more worked away from home, as maids, for several years. Three of the girls came from homes which were financially poor but where neatness of personal appearance and orderly housekeeping were definitely a part of the impression of the writer when he visited with the subjects' parents. When it is added that the two unmarried women who qualify in the well-adjusted class are at present working as maids in homes (superior homes) where they have been employed for several years, the rôle of domestic training and atten-

tion to personal appearance in the success of mentally subnormal girls is clearly emphasized.

To the 16 individuals who have already been mentioned as having had the advantage of training which would improve their domestic qualifications and their concern for personal appearance there can be added two more who very definitely qualify under the latter heading. They are individuals who have been, and still are, employed in beauty parlors.

In contrast with the experience of the 21 individuals described above it is found that only 11 of the remaining 48 women have had training in home management and personal appearance that could be considered at all satisfactory, and of these 11 there are six who are listed as "unemployable" in Table 13; that is, they live in rather good homes and are made to be neat in appearance but their dependence is so marked that they could not be expected to assume any responsibility for their own support.

The predominant presence of the factors of better personal appearance and superior training in domestic responsibility in the group of well-adjusted women and the hardly to be doubted connection between these qualifications and the better marriages of 90 per cent of the group seems to the writer to warrant the conclusion that in these characteristics is found the most convincing explanation of the relatively greater success of the 21 individuals designated "well adjusted."

THE INDIVIDUALISTIC NATURE OF CONDITIONS DETER-
MINING THE SUCCESS OF MENTALLY
SUBNORMAL MEN

A detailed analysis of the characteristics of the men who belong to the well-adjusted class fails to reveal any factor as consistently associated with success as is the case of personal appearance and domestic training with the female subjects.

Better personal appearance is not closely associated with the instances of superior adjustment in the male division. Some of the better-adapted men do make good personal appearances, but the poorly adjusted men qualify a corresponding number of their group under this head. The same applies to the trade learned, to differences in economic status of the homes from which the subjects came, and to differences in nationality. Each instance where any of these conditions is associated with a case of superior adjustment may be matched with another instance where poor adjustment exists.

Some of the more successful of the male subjects are referred to by acquaintances as being particularly "steady" and persevering, but there are others similarly characterized who are unable to support themselves financially. There does seem to be, however, a rather marked degree of patience with very drab work surroundings on the part of an appreciable number of the self-supporting men.

The only answer that seems to be permissible in replying to the question regarding the factors which condition the success of mentally subnormal men is that,

outside the tendency for successful adjustment to be associated with an advantage in measured intelligence (IQ), no clearly defined relationships can be discovered between special traits or influences and favorable outcomes. That certain individuals have had more success in meeting the problems of social adjustment is evident, but, beyond saying that there exists in these cases certain fortunate combinations of many factors in highly variable patterns, it does not seem safe to go with the evidence available.

VI

SUMMARY AND CONCLUSIONS

It is the purpose of this concluding chapter to summarize the principal findings regarding the present social status of the group of mentally deficient individuals whose careers, since they left the opportunity rooms of the Lincoln Public Schools, constitute the basis of the present study.

As explained in Chapter III the subjects of this investigation are now adults whose average age is approximately 27 years—the age range extending from 21 to 34 years. The average length of time out of school is approximately nine years—thus allowing for a reasonably adequate test of their ability to adjust themselves to the problems of adult life. How they have met these problems is a question which has been taken up in the form of nine principal inquiries the results of which now remain to be appraised.

A SUMMARY OF THE PRINCIPAL FINDINGS OF THE STUDY OF MENTALLY DEFICIENT INDIVIDUALS

The first question which this investigation was able to answer has to do with the present locations of the 206 mentally deficient and 206 control subjects. (This is not included as one of the nine principal inquiries.) Here it was found that the mentally deficient individuals tend to move from one part of a given neighborhood to another part more often than do persons of

average intelligence, but it was also apparent that they are more inclined to confine their moving to a rather restricted range as compared with the habits of the control subjects. Differences in economic status probably influence both these conditions, particularly with respect to the matter of frequent moves in a given community, inability to pay on a home or to keep up rent being a possible cause.

The investigation of home background reveals the pronounced frequency with which the subnormal subjects are associated with families where the wage earner is employed at unskilled, and often irregular, labor. Much greater percentages of these individuals come from homes characterized by antisocial conduct than is the case with persons of average intelligence. The number of brothers and sisters is larger in the case of the subnormals, and the families are more apt to be broken up by divorce.

With regard to educational achievement the most significant findings are that opportunity-room work has probably increased the opportunities for a greater number of these subjects to continue in school, thus raising the average grade above that usually reported for persons of this level of intelligence, and, secondly, there are individuals who have advanced beyond the elementary grades and, through unusual ambition and perseverance, taken some high school and post high school training.

The death rate in the case of the subnormal subjects presents two facts that may be given special notice. In the first place, the death rate for the mentally deficient

is seven times that for the control subjects—a circumstance which calls for a careful study which it was not possible to make in the present investigation. The second point that may be mentioned in connection with the death rate is that the figures for the subnormals do not run higher than those given in similar studies elsewhere. As a matter of fact the rate is slightly less for the subnormals of this particular community and is unusually low for the mentally normal subjects.

In the investigation of marital status it was found that fewer of the mentally subnormal subjects were married than was the case with individuals of average mentality, but, when the percentage for the former is computed on the basis of the number living outside of institutions, the difference between the rates of marriage in the two groups is not large. The number of divorces is virtually the same for the two populations.

Two differences which do stand out as statistically significant are those for the average number of children and for the average age of marriage among the women. When one considers that nearly 60 per cent of all the mentally subnormal girls located in this study were married at an average age below 20 years, the importance of early training for the responsibilities of home making is emphasized. This matter gains added significance when examined in connection with the importance of successful marriage in the case of those girls who can be called well adjusted: the problem presented in Chapter V.

The fifth inquiry enumerated in the list of nine had to do with the incidence of antisocial conduct in the

mentally deficient group as compared with the conduct of persons of normal intelligence. The results of this inquiry show that from three to seven times as many breaches of the law (from one type of ordinance to another) are charged against the subnormal group. This does, of course, point to the greater difficulty encountered by the mentally deficient, of this study, in shaping their conduct to conform to the laws and accepted social standards of the community. It does not, however, warrant hasty generalizations about the inherent antisocial nature of mentally defective persons, for certainly there are many other factors of environment and training which bear heavily upon this particular question. It is not the purpose here to analyze this question of possible reasons for the greater amount of misconduct in the subnormal group: to report the conditions that exist must suffice in the present study. To hold the facts of conduct irregularities up against the background of less stable home backgrounds, greater difficulty in securing employment, and more frequent residence in undesirable neighborhoods (to mention a few possible factors) does give the situation an outline which could well deserve special investigation.

The data regarding the employment of the subnormal subjects present two angles of approach for the purposes of interpretation. In one respect it is not too bright a picture to see that 61 per cent of this group are unable to hold steady employment and have histories of short term (less than six months) and infrequent occupation. On the other hand, when their men-

tal status, and the original prognoses for them, is considered, the fact that 39 per cent have held their jobs with a reasonable degree of success is of some consequence and furnishes at least an improvement upon the status which an earlier prediction would have suggested.

The results of the study of employment histories correlate rather highly with the economic status or record of economic independence where it is found that one-third as many mentally deficient individuals as control subjects have been wholly self-supporting. Again the fact that it has been possible for the former group to contribute this much to their own support is a matter that cannot be overlooked. The situation is even less discouraging when it is learned that 83 per cent of the subnormals have been to some extent self-supporting, the amount varying from the income derived from very simple tasks such as mowing lawns and occasional work in the homes of acquaintances to the income from regular and relatively permanent employment.

This leads to the question of the effect of the depression upon the economic status of subnormal individuals as compared with persons of normal intelligence. The records of the various relief agencies in the communities where these subjects have lived were made available for this study.

In 1930, at which date the average age of the subjects was approximately 21.5 years, there were 16.57 per cent of the subnormals receiving relief, at a time when 5.34 per cent of the controls were in a similar position economically. Since January, 1931, the percentage

increase in the ranks of the control subjects has been greater than with the subnormals, there now being three times as many control subjects on relief as compared with an increase of two and one-half times in the subnormal group. The percentages at the present time are 41.91 for the mentally deficient subjects and 15.53 for the controls. Of course it is possible to consider these figures from another angle, namely, that the depression has added two and one-third times as many subnormals to the relief lists as it has added control subjects. The additional fact that the amount of relief received has been somewhat greater per capita with the subnormals strengthens the conclusion that mentally deficient individuals suffer more—on a proportionate scale—than do persons of normal intelligence, because of a depression.

Finally, the problem of the relative importance of the differences of individual traits and past experiences in determining the success or failure of mentally deficient persons was analyzed. Chapter V was devoted to the discussion of this question.

Of the various circumstances that enter into the complex pattern of the life of men and women it was concluded that better personal appearance and training in types of work that particularly qualify them for home making were the most noticeable characteristics of the well-adjusted mentally subnormal women. The possible connection between the influences of these factors and the decidedly greater percentage of marriage in the group of 21 well-adjusted women gives additional weight to the significance of personal appearance and training in the duties of the home.

That differences of measurable intelligence did not influence the success of the better-adjusted females—as compared with the less fortunate women—is evidenced by the statistically unreliable margin in favor of the well-adjusted individuals.

Other factors which have little relation to the successful adjustment of mentally deficient women (as far as this study is concerned) are nationality, economic status of parents, age, and number of brothers and sisters. The successfully adjusted women as well as the better-adjusted men averaged a year and one-half more at school than the subjects who are not so well adjusted.

In the case of the well-adjusted men the task of determining what factors were apt to be present was considerably more difficult. Outside of the difference in school grade and a statistically reliable difference in intelligence quotients there are no definitely differentiating circumstances. The conclusion—in lieu of more penetrating studies of the family backgrounds and home training—seems to be that a variety of factors thrown together in different patterns have terminated in better combinations with some individuals than with others.

FINAL APPRAISAL OF THE SOCIAL STATUS OF MENTALLY DEFICIENT INDIVIDUALS

The results of this study of the present social status of a group of mentally deficient subjects seem to justify the conclusion that, taken together, they have fared

better in the task of providing livings for themselves and getting along with their fellow men than the early prognoses indicated they might. That it is possible for many of them to remain law-abiding and useful citizens is suggested by the altogether satisfactory present status of a considerable number of the group.

When one tries to form a composite impression of the social status of the 206 men and women followed up in this investigation, it is doubtful whether as much hopefulness is warranted as some studies of other groups imply. Fairbanks' study, for instance, leads to more optimistic conclusions. On the other hand, the notion that deficient mentality practically precludes social usefulness and the chance for happiness on the part of the individual is certainly not supported by the results of the present study. That even a greater number of mentally deficient individuals may come to be well adjusted and better able to enjoy life as our program for their training in school and their supervision after school is improved can hardly be doubted when their possibilities are carefully and sympathetically examined.

APPENDIX A

Name School Parent ()
 Present Address Address when in school
 Birth Date
 IQ Test
 Nationality Birth place of parent
 Parents' Occupation Type of Community
 Number of siblings, Boys Girls
 Parents' Economic Status

Subsequent History

School record:

Grade completed Where? When?
 Special achievements in school

Economic record:

Record of employment

 Present occupation

Marital Status:

Married? To whom? At what age?
 Number of children Divorced?

Institutional Commitments:

Where:	When:	Reasons:
.....
.....
.....
.....

Police and Juvenile Court Record:

.....

Conduct record not involving courts:

.....

Relief and Social Welfare Aid:

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Other Information:

REFERENCES

1. BERRY, R. J. A., & GORDON, R. G. The mental defective. A problem in social inefficiency. New York: McGraw-Hill, 1931. Pp. 146.
2. BLACKKEY, E. The social adjustment of children of low intelligence. II. The social and economic adjustment of a group of special-class graduates. *Smith Coll. Stud. Soc. Work*, 1930, 1, 160-179.
3. BRONNER, A. F. Follow-up studies of mental defectives. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1933, 38, 258-264.
4. BRYNE, M. E. A study of post-school adjustments of boys and girls of special classes for retarded children in the Minneapolis public schools. Department of Special Education, Minneapolis Public Schools, Minneapolis, 1930. Pp. 58.
5. BURR, E. T. The vocational adjustment of mental defectives. *Psychol. Clin.*, 1931, 20, 55-64.
6. BURT, C. The young delinquent. New York: Appleton, 1925. Pp. 607.
7. CHANNING, A. Employment of mentally deficient boys and girls. United States Children's Bureau. Publication No. 210. Washington: Govt. Print. Off., 1932. Pp. 107.
8. CONKLIN, F. E., & PERKINS, H. F. How large families do feeble-minded parents have? *Eng. News*, 1928, 13, 92-93.
9. DAYTON, N. A. Mortality in mental deficiency over a 14-year period: analysis of 8,976 cases and 878 deaths in Massachusetts. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1931, 36, 127-205.
10. DOLL, E. A. Education and training of the feeble-minded. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1932, 37, 99-116.
11. ———. Parole of the feeble-minded. *Tr. School Bull.*, 1931, 28, 1-10.
12. ———. Social adjustment of the mentally subnormal. *J. Educ. Res.*, 1934, 28, 36-43.
13. ———. Community control of mental deficiency in the United States. *J. Ment. Sci.*, 1933, 79, 578-589.
14. DURLING, D. The low intelligence quotient as economic index. *J. Juv. Res.*, 1931, 15, 278-287.
15. FAIRDANKS, R. E. The subnormal child—seventeen years after. *Ment. Hygiene*, 1933, 17, 177-208.

16. FERNALD, M. R., HAYES, M. H. S., & DAWLEY, A. A study of women delinquents in New York State. New York: Century, 1920. Pp. 540.
17. FERNALD, W. E. The feeble-minded in the community. Address, included in *Social Aspects of Mental Hygiene*. New Haven: Yale Univ. Press, 1925. Pp. 150.
18. ———. After-care study of the patients discharged from Waverly for a period of twenty-five years. *Ungraded*, 1919, 5, No. 2.
19. ———. The burden of feeble-mindedness. *Med. Communications Mass. Med. Soc.*, 1912, 23, 3-17.
20. FOLBY, R. W. A study of the patients discharged from the Rome State School for the twenty-year period ending December 31, 1924. *Proc. 53rd Ann. Meeting Amer. Asso. Stud. Feeble-minded*, 1929, 34, 180-207.
21. GODDARD, H. H. Human efficiency and levels of intelligence. Princeton: Princeton Univ. Press, 1920. Pp. 128.
22. ———. Levels of intelligence and the prediction of delinquency. *J. Juu. Res.*, 1929, 13, 262-265.
23. ———. Feeble-mindedness: a question of definition. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1928, 33, 219-227.
24. GREEN, C. V. Birth and death rates of the feeble-minded. *J. Juu. Res.*, 1928, 12, 244-248.
25. HAY, L., & KAPPENBURG, B. The social adjustment of children of low intelligence. Part III. *Smith Coll. Stud. Soc. Work*, 1931, 2, 146-174.
26. HEALY, W., & BRONNER, A. E. Delinquents and criminals, their making and unmaking. New York: Macmillan, 1926. Pp. 317.
27. HOFMAN, W. Erhebungen über die Berufsfähigkeit entlassener Hilfsschüler. *Hilfsschule*, 1930, 23, 123-145.
28. HOLMAN, P. Following up the special school child. *Ment. Welfare*, 1933, 25, 83-88.
29. ITARD, J.-M.-G. The wild boy of Aveyron. New York: Century, 1932. Pp. 104.
30. KEYS, N., & NATHAN, J. M. Occupations for the mentally handicapped. *J. Appl. Psychol.*, 1932, 16, 497-511.
31. KINDER, E. T., & RUTHERFORD, E. J. Social adjustment of retarded children. *Ment. Hygiene*, 1927, 11, 811-833.
32. LITTLE, A. N., & JOHNSON, B. S. A study of the social and economic adjustments of one hundred thirteen discharged parolees from Laconia State School. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1932, 37, 233-248.

33. LURIE, L. A., SCHLAN, L., & FREIBERG, M. A critical analysis of the progress of fifty-five feeble-minded children over a period of eight years. *Amer. J. Orthopsychiat.*, 1932, 2, 58-69.
34. MARTZ, E. W. Mortality among the mentally deficient during a twenty-five year period. *Tr. School Bull.*, 1934, 31, 185-197.
35. MATHEWS, M. A. One hundred institutionally trained male defectives in the community under supervision. *Ment. Hygiene*, 1919, 6, 332-342.
36. MURCHISON, C. Criminal intelligence. Worcester: Clark Univ. Press, 1926. Pp. 291.
37. OLIN, I. The social adjustment of children of low intelligence. A follow up of 26 problem children with intelligence quotients under normal. Part I. *Smith Coll. Stud. Soc. Work*, 1930, 1, 107-159.
38. PATERSON, D. G., & RUNDQUIST, E. A. The occupational background of feeble-mindedness. *Amer. J. Psychol.*, 1933, 45, 118-124.
39. PINTNER, R., & PATERSON, D. G. A psychological basis for the diagnosing of feeble-mindedness. *J. Crim. Law & Criminol.*, 1916, 7, 32-35.
40. POWDERMAKER, F. Social adjustment of the feeble-minded. *Ann. Amer. Acad. Pol. & Soc. Sci.*, 1930, 149, 59-69.
41. PRESSEY, S. L., & PRESSEY, L. C. Mental abnormality and deficiency. New York: Macmillan, 1927. Pp. 356.
42. ROSANOW, C. Is lack of intelligence the chief cause of delinquency? *Psychol. Rev.*, 1920, 28, 147-157.
43. SHIMBERG, M. E., & REICHENBERG, W. The success and failure of subnormal problem children in the community. *Ment. Hygiene*, 1933, 17, 451-465.
44. SLAWSON, J. The delinquent boy. A socio-psychological study. Boston: Badger, 1926. Pp. 477.
45. STANGER, F. A. The relation of mental deficiency to crime. *Tr. School Bull.*, 1933, 30, 22-27.
46. STEBBINS, I. F. Salvaging the feeble-minded. *Psychiat. Quart. Suppl.*, 1931, 4, 312-316.
47. STECKEL, M. L. A "follow-up" of mentally defective girls. *J. Soc. Psychol.*, 1934, 5, 112-115.
48. STORRS, H. C. A report on an investigation made of cases discharged from Letchworth Village. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1929, 34, 220-232.

49. Terman, L. M. The measurement of intelligence. Boston: Houghton Mifflin, 1916. Pp. 362.
50. Thomas, H. P. The employment history of auxiliary pupils between sixteen and twenty-one years of age in Springfield, Massachusetts. *Proc. & Addr. Amer. Asso. Stud. Feeble-minded*, 1928, 33, 132-144.
51. Town, C. H. An investigation of the adjustment of the feeble-minded in the community. *Psychol. Clin.*, 1931, 20, 42-54.
52. Town, C. H., & Hill, G. E. How the feeble-minded live in the community. A report of a social investigation of the Erie County feeble-minded discharged from the Rome State School, 1905-1924. Buffalo: Children's Aid Society, 1929. Pp. 284.
53. Tredgold, A. F. Mental deficiency. (5th ed.) New York: Wood, 1929. Pp. 535.
54. Wallin, J. E. W. Clinical and abnormal psychology. Boston: Houghton Mifflin, 1927. Pp. 649.
55. ———. Who is feeble-minded? *J. Crim. Law & Criminol.*, 1926, 7, 56-78.
56. Werner, C. O., & Guilford, J. P. Character trends versus mental deficiency in the problem of delinquency. *J. Crim. Law*, 1926, 16, 610-612.
57. White House Conference on Child Health and Protection. Section III. Education and Training Committee on Special Classes. New York: Century, 1931. Pp. 604.
58. ———. Section IV. The Handicapped. Committee on Physically and Mentally Handicapped. New York: Century, 1933. Pp. 1452.
59. White, W. A. The principles of mental hygiene. New York: Macmillan, 1928. Pp. 323.

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Child Behavior, Animal Behavior,
and Comparative Psychology

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GENETIC PSYCHOLOGY MONOGRAPHS

**Child Behavior, Animal Behavior,
and Comparative Psychology**

THE INFLUENCE OF SPECIFIC EXPERI- ENCE UPON MENTAL ORGANIZATION*

From Barnard College, Columbia University

By

ANNE ANASTASI

*Accepted for publication by Carl Murchison of the Editorial Board and received in the Editorial Office, March 30, 1936.

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ANNE ANASTASI

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I

GENERAL PROBLEM AND LITERATURE¹

A. THE PROBLEM UNDER INVESTIGATION

That field of psychology which has come to be known as "mental organization" is rapidly attaining very extensive proportions and attracting interest in all branches of the science. The theories, methods, or findings on mental organization have made their way into such diverse fields as test construction (11, 85, 121, 132, 161, 257), the interpretation of group differences (18), the analysis of personality (29, 69, 135, 137, 142, 202, 243, 259), abnormal psychology (206, 245), the measurement of interests (38, 242, 245, 247), and the study of animal behavior (12, 56, 122, 238), to name only the most outstanding examples. At the same time, however, students of mental organization have been engaged in controversies of long standing on fundamental differences in method or interpretation. It seems to the writer that much of this controversy has arisen from the attempt to generalize too broadly from the results of single investigations, with the resulting expectation that studies employing subjects who differ in age, environmental background, occupation, etc., should yield similar results. In 1932, the writer (8, p. 58) called attention to the "possibilities regarding environmental influences and training in relation to problems of mental organization" and added, "Espe-

¹The present study was conducted under the auspices of the Columbia University Council for Research in the Social Sciences.

cially fruitful in this connection would be the experimental study of the effect of special training on intertest correlations, as well as the comparison of correlation results in groups of widely diverse training and background." It would indeed seem that the nature of trait relationship can most profitably be investigated through the comparison of just such discrepancies from group to group, when these are considered in relation to the factors producing them. A crucial test of this hypothesis would be the *experimental production* of such changes in mental organization as are found in the studies on different groups. This has been the purpose of the present study. But before proceeding, it may be well to review briefly, and formulate more clearly, the present status of the problem of mental organization.

B. THEORIES OF MENTAL ORGANIZATION

Theories of mental organization were first placed on an empirical basis with the publication of Spearman's 1904 article (165) in which were offered a method and a theory. According to Spearman's Two-Factor Theory, "all branches of intellectual activity have in common one fundamental function (or group of functions) whereas the remaining or specific elements of the activity seem in every case to be wholly different from that in all others" (165, p. 84). It was pointed out from the first, however, and particularly stressed in the 1912 article with Hart, that "correlation between performances is also produced by great similarity between

them," but, "when this likeness is diminished (or when the resembling performances are pooled together), a point is soon reached where the correlations are still of considerable magnitude, but now indicate no common factor except the General one" (87, p. 59). Group factors of very narrow scope and relatively insignificant import are thus admitted. Following subsequent investigations such as those of Davey (48), Stephenson (198, 199, 200), MacFarlane (117), and Alexander (5, 6), somewhat broader group factors of verbal ability and spatial or "practical" ability were included. Finally, on the basis of a series of studies by Jones (cf. 175), Lankes (111), Bernstein (15), Flügel (70), Webb (259), and Garnett (73, 74), additional general factors were suggested (175, 181), including p (perseveration), o (oscillation), and w (will), the last extending the theory to the field of conative activities. The g factor is regarded by Spearman as corresponding to the general mental energy of the individual, although this interpretation is not an integral nor a necessary part of his basic theory. The suggestion is also made that p may denote the inertia of mental energy and o the unsteadiness of its supply, and hence all three general factors may be but different manifestations or aspects of the same fundamental factor. The chief differentiating characteristic of Spearman's theory at present seems to be its emphasis on the g factor as the chief influence in producing correlation, and its relegation of group factors to a position of minor importance.

Thomson has proposed a Sampling Theory of men-

tal organization which has undergone little or no change in successive publications (26, 211-229). In a recent article, he states: "My own belief is that the mind is not divided up into 'unitary factors,' but is a rich, comparatively undifferentiated complex of innumerable influences; on the physiological side an intricate network of possibilities of intercommunication" (229, p. 185). Behavior, according to Thomson, depends upon a very large number of independent elements which he has at times tentatively identified with neurones or bonds between neurones. Any one activity of the individual depends upon or involves a particular "sample" or pattern of these elements; correlation is due to overlapping of different samples of elements. There may thus be found any number of different types of factors, varying from the specific, through group factors of differing extent, to the general. Thomson has repeatedly illustrated, with data from dice throws, how various factor patterns could result from overlapping samples of independent elements. Improvement in a function with practice, according to the Sampling Theory, is not due to improvement in the elemental abilities involved but to a more economical and efficient selection of these abilities. A practical illustration of this is the well-known dropping out of unnecessary movements in the learning of a motor skill.

Thorndike's views on the relationships of mental traits seem at first glance to have run the gamut from extreme specificity to the opposite extreme of a single general factor. Certain underlying similarities will,

however, be found, with a gradual evolution in emphasis as more data were made available. Thorndike's belief in strict specificity is ordinarily traced to the 1909 article by Thorndike, Lay, and Dean (237), in which, after reporting very low correlations between tests of sensory discrimination and estimates of intelligence from ratings and school grades, Thorndike concludes:

In general there is evidence of a complex set of bonds between the psychological equivalents of both what we call the formal side of thought and what we call its content, so that one is almost tempted to replace Spearman's statement by the equally extravagant one that there is *nothing whatever* common to all mental functions, or to any part of them (p. 368).

Again, in the 1914 edition of *Educational Psychology* (230), appear the following statements:

. . . the mind must be regarded not as a functional unit, nor even as a collection of a few general faculties which work irrespective of particular material, but rather as a multitude of functions, each of which involves content as well as form, and so is related closely to only a few of its fellows, and to others with greater and greater degrees of remoteness . . . we need to bear in mind the singularity and relative independence of every mental process, the thoroughgoing specialization of the mind (pp. 366-367).

Thorndike also pointed out that, "the circumstances of training would seem to sometimes intensify and sometimes weaken original relations" (p. 371). It will be noted that the possibility of narrow group factors is admitted even in these early statements, and the influence of environment in altering the organization of abilities is suggested.

In 1921, following the analysis of intercorrelations

among the subtests of Army Alpha and Beta, Thorndike (232) suggests the possibility of fairly broad group factors of form as well as content, such as numerical and spatial aptitude. In a symposium on *Intelligence and Its Measurement* (233) appearing in the same year, he states: "We know that, taking people as we find them, the ability measured by verbal tests is not the same as the ability measured by non-verbal tests; and there is reason to expect other similar specializations" (p. 126). But in this case specialization means group factors of fairly broad extent. At the same time, more emphasis is shifted to the environment as an influence which might produce specialization, as shown by the following statement:

All of the above [referring to specialization], of course, concerns individuals as we find them, products of nature and nurture. Spearman's doctrine might fit the *original* nature of intellect better. Certain factors, like ability to understand oral language, ability to read, ability to perceive objects in three dimensions, which occur to everybody as neither entering into all cognitive performances of a person nor entering into only a few very closely similar performances, might in original nature be absorbed into one unitary ability to learn (233, p. 151).

Thorndike's frequently quoted analysis of intelligence into abstract, mechanical, and social "intelligences," within each of which is found "relatively great consistency" whereas "between one and another of these three there is relatively great disparity," also appeared at about this time (231). It is doubtful, however, whether this analysis should be incorporated into a survey of Thorndike's basic theory since it was offered

only as a practical suggestion to expedite testing; it does, in any event, fall in line with the above suggestions of broader group factors.

In *The Measurement of Intelligence* (236), Thorndike swings all the way to a general factor theory with his Quantity Hypothesis. This hypothesis

asserts that in their deeper nature the higher forms of intellectual operation are identical with mere associations or connection forming, depending upon the same sort of physiological connection but requiring *many more of them*. By the same argument the person whose intellect is greater or higher or better than that of another person differs from him in having . . . simply a larger number of connections of the same sort (p. 415).

Thorndike also suggests (p. 422) that "we may be able for many purposes to *replace our measurement via a sample inventory of tasks, by a more or less direct measurement of c,*" the latter representing the total number of connections which the individual can possibly have by original capacity. Attention is called to the fact that this hypothesis limits itself to the organization of original capacity, and that various other relationships may be environmentally produced. The chief difference between the Quantity Hypothesis and Spearman's theory seems to be that in the former the number of possible connections is substituted for mental energy as the interpretation of the general factor. Very recently (235), Thorndike has stated a number of "tentative conclusions" on the basis of the current evidence on trait relationships. Specialization, for instance, is again stressed, and many of the recently proposed group factors are found to "correspond interestingly"

to "conceivable biological realities," although equally often they are found not to. In summary, Thorndike suggests that:

Any theory or scheme of the organization of the mind must provide on the one hand for millions of connections between specific things and events and specific responses to them, and on the other, for hierarchal and other linkages among these due to factors that are very widespread, or very potent over a limited area, or both.

In this can be noted a certain similarity to Thomson's Sampling Theory.

Lastly, we may consider what can conveniently be classified as Group Factor or Multiple Factor theories. The publication in 1928 of Kelley's *Crossroads in the Mind of Man* (105) paved the way for a large number of studies in quest of particular group factors. Kelley contended, after a critical analysis of the methodology and data of Spearman, that the general factor is of relatively minor importance and could usually be attributed to heterogeneity in age, sex, social or academic status, racial background, etc., as well as to the common verbal nature of the tests employed. If a residual common factor be found when these influences are ruled out, it will probably be very small and insignificant. The major relationships among tests are attributed to a relatively small number of broad group factors, chief among which are manipulation of spatial relationships, facility with numbers, facility with verbal material, memory, and mental speed (105, p. 10).

Thurstone (248) has also identified himself with

some form of multiple factor theory, although he has been more concerned with the development of methods than with the formulation of a definite theory.

Garrett has initiated a number of studies to identify and locate particular group factors, and seems to incline toward a theory of a small number of broad group factors, although a general factor, especially as described in Thorndike's Quantity Hypothesis, is also admitted (84, pp. 28-29). The relative importance assigned to general and group factors is determined partly by the group of subjects investigated and partly by practical considerations. Thus, he writes:

A person's abilities may be described in a variety of ways. . . . Factor analysis offers a precise method of description with reference to a mathematically defined frame of reference. Which of the many possible descriptions of an individual is the "best" one will depend, it would seem, upon the purposes of the investigator. Description in terms of factors does possess, however, certain advantages over purely verbal accounts. And it offers, too, decided advantages in that it affords a quantitative basis for prediction (82, pp. 300-301).

Hull (98) at one time proposed a strict group factor theory, in which are rejected not only the universal general factor but also specifics, on the grounds that it is possible to explain the relationships found among traits without recourse to specifics, and, furthermore, specifics "imply a prodigality of special organic mechanisms quite out of harmony with what we know of biological economy" (p. 203). The group factors in Hull's theory were *weighted* and *overlapping* factors, any one aptitude involving an aggregate of factors, each weighted in a certain way by nature (131).

Meili (125) has put forth a rather curious modification of group factor theory. On the basis of tetrad analysis of test scores on several groups, he found evidence of group factors, chief among which he mentions the inventive, analytical, abstract, concrete, and visual, the last referring to the ability to deal with pictures and geometrical figures and probably being more nearly a spatial factor. Meili stresses the point, however, that these factors are simply points of view from which one may describe the "intelligent act,"¹² the latter being not the sum or resultant of various independent factors, but a unitary function manifesting diverse qualities. By this, however, he does not mean the same as does Spearman when he refers to a number of general factors, since both his description and allocation of the factors and the statistical evidence presented show Meili's factors to be group factors common to some of his tests and not to others.

Tryon (250, 251, 252, 253, 254) has recently offered a theory of "psychological components" described as "concepts, and motivational and emotional dispositions" (254, p. 454). These determinants of behavior exist in very large numbers, vary in degree of generality, and combine in complex ways not necessarily additive. They are ultimately traced on the hereditary side to large combinations of genes, and, on the environmental, to the particular environmental fields in which those concepts were encountered. Correlations of varying size among different concepts may

¹²"*L'acte d'intelligence.*"

result from (1) community of multiple psychological components, or overlap, (2) culturally determined correlation between independent environmental fields, and (3) correlation between independent gene blocks through successive generations of assortative mating. It will be noted that Tryon's theory, in its present form, bears a certain fundamental resemblance to Thomson's Sampling Theory.

G. METHODOLOGY OF MENTAL ORGANIZATION

The present paper is not directly concerned with questions of method, and the extensive literature which has accumulated on technical controversial points will be but lightly touched upon. The first technique suggested by Spearman for testing the Two-Factor Theory was the *hierarchal* arrangement of correlation coefficients, which refers to the possibility of arranging a set of intercorrelations in such a way that they decrease consistently in size both along the rows and along the columns. The *intercolumnar correlation* was later suggested as a convenient numerical index of this relationship, and finally this was replaced by the *tetrad criterion*, mathematical proofs for which were later independently derived by Garnett (73), Spearman (175), E. B. Wilson (260-267), and others. The possibility of more generalized multiple factor analyses was first indicated by Garnett in 1919 (73, 74), but the principles and techniques suggested at that time were not followed up nor very widely employed.

The present widespread application of factor pat-

tern analysis may be said to have begun in 1928 with the publication of Kelley's *Crossroads in the Mind of Man* (105). In that book, Kelley outlined an iterative technique for arriving at the factor loadings, after the tetrad equations have been computed. He has recently (108) replaced this method with a more refined and direct approach through the method of *principal axes*, which yields a set of orthogonal components and involves the rotation of axes, before factorization, until one is reached which can be unambiguously described, such as age or sex; the other axes can then be located with this as a point of reference. Thurstone (241-248) has developed a *center of gravity* method, for which various alternative solutions and modifications are offered. In its most recent form, this method employs only axes which shall yield positive factor loadings, and involves the rotation of axes, after factorization, until a set of axes is obtained which can be most readily interpreted in terms of psychological or biological entities. Hotelling (96) has worked out a method of principal axes, or *principal components*, which gives the maximum weight to one factor, and has offered an iterative solution for the factor loadings.

Thomson has written an extensive series of papers (211-229) on technical methodological points, most of which are concerned with an evaluation of Spearman's methods and interpretations. Chief among the points which he has repeatedly stressed is the fact that the tetrad criterion *can* be satisfied without a *g* factor and, furthermore, that the most probable mean value of a set of tetrad differences would by chance be zero.

These points he has empirically demonstrated with data from dice throws. In addition, Thomson has frequently called attention to the fact that "innumerable factorial analyses are possible, and that any choice between them must be made on psychological grounds" (229, p. 185). Any set of intercorrelations can be analyzed into factors in an infinite number of ways, and the various techniques of factor analysis which have been proposed are each based on a different choice of postulated conditions which the particular factor pattern must satisfy. These "limiting conditions" must be imposed in order to obtain a determinate solution. Examples of such limiting conditions are: that the number of factors shall be a minimum; that one factor shall have the maximum weight possible; that as many weights as possible shall be zero; that the factors shall be uncorrelated with each other (orthogonal axes).

D. GENERAL TRENDS IN PREVIOUS DATA

It is particularly difficult to summarize the data on mental organization. The marked differences in nature and number of subjects employed, specific tests selected, and statistical treatment of the data usually necessitate a detailed and complete examination of each study before the reader can compare its major findings with those of other studies. The specific findings have little or no meaning except when considered in relation to the conditions under which they were obtained. Thus only the most tentative and general statements can

be made regarding our present knowledge of the facts of mental organization.

Perhaps the most general finding, especially in the more recent and better-controlled studies, is the presence of group factors of varying extent. There is hardly a single recent study in which group factors of some sort have not been found, although in a few cases they either have been ruled out in the course of the study by "pooling" similar tests or have been attributed to extrinsic and possibly irrelevant conditions. Kelley (105) found evidence of group factors of verbal, numerical, and spatial ability, memory, and speed in different groups of school children from the kindergarten, third, and seventh grades. He also reports (105, Chap. IX) statistical analyses of the data of nine published studies by different investigators on adults as well as children, which yield similar evidence for the presence of the above-mentioned factors. Schneck (155) found clear-cut evidence of group factors of verbal and numerical ability in a group of college men. Garrett (80) found verbal and numerical factors in an analysis of the four subtests of the Thorndike C A V D on college girls. Brigham (132) and Brolyer (132) report group factors through the verbal and numerical subtests of the Scholastic Aptitude Test of the College Entrance Examination Board. Evidence of an independent verbal factor is also to be found in the investigation of Davey (48) and later and more conclusively in those of Stephenson (198, 199, 200); both investigators employed school children. Peatman (140), in his analysis of the Thorndike Intelligence Examina-

tion for High School Graduates on a group of college men, attributed the community found among the various subtests to the verbal factor. J. H. Wilson (268), from an analysis of the performance of school children on eight tests, found "a suggestion of the presence of a group factor" among the verbal tests, a "greater suggestion" of a factor between the memory tests, and strong evidence of a factor between the arithmetic tests.

In an early study on school children, Carey (33) found evidence of a small and not very significant factor of memory. More recently, Anastasi (7, 8), employing several groups of college students, found no evidence of a common memory factor, but rather a number of narrower group factors arising from similarity of materials among the tests. Du Bois (55) presents data on college students which suggest the presence of a speed factor, although a number of common factors of material or content cut across this speed factor. Suggestive though inconclusive evidence for the presence of an independent factor or factors in tests of spatial or "practical" ability is to be found in the work of MacFarlane (117) and Earle (59, 60). Cox (42, 43) located an independent *m* factor in tests of mechanical aptitude, which he asserts is quite distinct from the "practical" ability measured by the performance scales of intelligence. In a later study (44), he presents evidence for an additional independent "routine manual" factor. Paterson *et al.* (138), in the analysis of their results on high school boys with the Minnesota Mechanical Aptitude Tests, located a num-

ber of narrow group factors in their series of tests, rather than one unitary factor of mechanical aptitude. Stephenson (205), in a further analysis of the data reported by Brown and Stephenson (24) together with additional previously unpublished data, suggests the presence of a spatial factor in addition to the verbal. Meili (125), in the attempt to check upon his hypothesis that intellect can be analyzed into abstract, concrete, analytical, and inventive factors, obtained rather complex factor patterns with numerous group factors; the tests employed were verbal, numerical, and spatial in their content. Alexander (6), in a recent and very thorough investigation on both children and adults, established the presence of a group factor of "practical intelligence," F , predominant in the performance type of intelligence test. The independence of this factor from the verbal factor as well as from Spearman's g was demonstrated.

It will be noted that the majority of the factors suggested are based on community of material or *content* among the tests, rather than community of what has been variously termed structure, process, or *form*. "Content" factors have also been more definitely established, whereas the evidence for "form" factors is more conflicting and is confused by the more potent content factors cutting across the tests which are similar in form. In the studies of Davey (48) and Stephenson (198, 199, 200) there is evidence of the greater potency of content factors. Anastasi (8) found material much more influential than process in determining correlations among memory tests. G. M. Smith (162, 163), in a

very comprehensive study on college students designed especially to determine the relative influence of "material" and "structure," found the former more important; this conclusion was based on an analysis of the correlations by both the method of "directed mean tetrads" and Hotelling's method of principal components.

A comparison of studies differing in the type of subjects employed reveals a third possible fact of mental organization which, in the opinion of the writer, has not hitherto received adequate notice. We refer to the *variations* in factor pattern from one group to another. By this is not meant the more obvious variations resulting from differences in heterogeneity of the samplings. The influence of heterogeneity has been pointed out by Spearman (175, 184) and others, particularly stressed by Kelley (105), demonstrated in actual test data by Cureton and Dunlap (46), and analyzed on data from dice throws by Garrett and Anastasi (83). Even when comparing groups of approximately the same degree of heterogeneity, however, marked differences in factor pattern are often found. It is with such intergroup differences that we are more specifically concerned.

Spearman (175) has called attention to these differences, stating:

Another important influence upon the saturation of an ability with g appears to be the class of person at issue (p. 217).

After reporting data to illustrate this fact, he concludes that:

the correlations always become smaller—showing the influence of g on any ability to grow less—in just the classes of persons which, on the whole, possess this g more abundantly. The rule is, then, that the more “energy” a person has available already, the less advantage accrues to his ability from further increments of it (p. 219).

Those who possess more g would include the brighter as well as the older subjects. Spearman also suggests that “increasing age tends to differentiate individuals more and more in respect of s ” (p. 220), thus making the correlations with g decrease with age.

The data on this question are still somewhat conflicting and meager. A number of studies by Pressey (148), Wallin (256), Merrill (127), de Voss (51), and A. W. Brown (20) have been concerned with “unevenness of ability” in children of *different degrees of “intelligence,”* estimated by measuring the amount of scatter of each child’s performance on the Stanford-Binet or some other intelligence or achievement scale. These studies have yielded conflicting results, which may in some cases be attributed to the small number of subjects and to irregularities in scale values at different age levels in the tests employed. Brown’s study (20), probably the best controlled, yielded negative results; the “dull” subjects in this study, however, consisted of the lowest quartile of a somewhat superior group, and were possibly not sufficiently different from the rest to yield clear-cut results. Spearman (175), on the other hand, employing data collected by Abelson (1), reports intercorrelations of 12 tests administered to 78 normal and 22 dull children. The intercorrelations were much higher in the dull group, the average of all

the correlations corrected for attenuation being .466 for the normal and .782 for the dull.

The effect of *age* on "scattering" on the Stanford-Binet was also studied by Pressey (148) with inconclusive results. Burt (30, 175, p. 218) correlated scores on his reasoning test with teachers' estimates of the general ability of their pupils and found a steady decrease in this correlation from .78 in the age group 10-11 to .59 in the 13-14 year group. Spearman (175), employing the raw data reported by Otis (136) in a study on school children and those given by Carothers (34) on some similar tests administered to college girls, finds that the correlations of these tests with *g* are lower in the college group. It should be noted, however, that Otis' group, consisting of fourth-, sixth-, and eighth-grade school children, was much more heterogeneous than Carothers' college group, a fact which in itself could account for the lower correlations in the latter. Similarly E. S. Jones (102), in a comparison of the results obtained by Burt (28) on schoolboys with those obtained with some of the same tests administered to college students by Calfee (31), calls attention to the lower intercorrelations found by the latter. Bonser (17), in his study of the reasoning ability of school children, administered seven verbal and numerical tests to 757 children. Separate intercorrelations were computed for each grade from 4*A* to 6*A* and also for 12 age groups from 9 to 16. Many of the correlations varied widely from group to group, but no consistent trends were exhibited. The number of subjects was frequently very small, however, ranging from 50 to 98

for grade-groups and from 6 to 63 for age-groups. E. S. Jones (1902), in a study especially designed to investigate the influence of age and experience on correlations, reports intercorrelations of test scores on the same group of 203 boys retested yearly between the ages of 14 and 17. Unfortunately, the tests employed were rather simple and of doubtful reliability; they included cancellation, substitution, immediate rote memory for numbers, sentence completion, and opposites. The intercorrelations did not show any general trend either to rise or to fall with age. The average correlation of each test with all the others did, however, exhibit a very consistent though slight drop from the first to the second year, and then a rise from the second to the third year; the averages of all of these average correlations were .217, .193, and .242 for the first, second, and third years, respectively. Jones attempts to explain these findings in terms of adaptation and practice phenomena.

Stead (1977) obtained four sets of measures on 227 school children consisting of the following groups: (A) 39 11- to 12-year-old boys, (B) 135 12- to 13-year-old boys, (C) 61 13- to 14-year-old boys, (D) 17 secondary school boys, ages 14 to 15, (E) 25 13- to 14-year-old girls. The measures included: "mental" tests, such as opposites, analogies, number series; motor ability tests; scholastic tests; and teachers' ratings on six character traits. The total summative scores on all the tests within each set were correlated. Disregarding the results on group D because of selective factors and small number of cases, we find that the

correlations between scholastic and mental tests and between scholastic tests and character ratings show no significant or consistent age change. The correlations between mental and character measures decrease with age, and the correlations of motor tests with each of the other categories exhibit a consistent and marked decrease with age. In a recent investigation on "mechanical" and "routine manual" factors and their relation to tests of general intelligence, Cox (44) reports correlations between several "routine assembling" tests and intelligence tests in both adults and children. In a group of 43 adults, these correlations were all negative and close to zero. In two groups of 60 schoolboys and 36 schoolgirls, respectively, the correlations, with age partialled out, were positive and fairly significant, averaging .20 in the former and .29 in the latter. Thus increasing specificity with age is again suggested.

A. W. Brown (20) administered the Haggerty Delta 2, Pintner Non-Language, and Stenquist Mechanical Aptitude and Assembly Tests to 456 boys between the ages of 10 and 13. The intercorrelations of the four tests were computed separately for each age group and exhibited a general rise with age, the averages^a being .36, .39, .41, and .45 for the age groups 10, 11, 12, and 13, respectively. When, however, the correlations were corrected for differences in variability, this trend disappeared, the average^a correlations now being .38, .45, .36, and .40.

^aComputed by the writer, by means of R. A. Fisher's *z*-scale.

Meili (125), in a study on five different groups, offers a variety of evidence on the discrepancies in trait relationship from group to group. He employed six tests: number series completion, picture series rearrangement, spatial analogies, picture completion, drawing construction, and sentence construction. The five groups included: (1) 165 20-year-old men in various occupations, (2) 90 to 97 14- to 20-year-old secondary school students of both sexes, (3) 70 12-year-old boys, (4) 51 11-year-old boys, and (5) 43 12-year-old girls. Separate sets of intercorrelations were computed for each group, and it was found that the average intercorrelation tended to increase with age, being .46 and .33 for the older groups (1) and (2), respectively, as contrasted with .21, .24, and .26 for groups (3), (4), and (5); at the same time the mean variation of the correlation coefficients tended to decrease with age. Thus the correlations were higher and more uniform in the older groups. Differences in variability and heterogeneity are, however, complicating factors in Meili's data, which he himself recognizes. Of more interest for our present purpose than the size of the average correlations is the fact that the particular factor pattern suggested by the correlations differed from group to group. Meili demonstrated this by correlating the correlation coefficients from pairs of groups, as well as by tetrad analysis. Finally, Meili drew up individual profiles for the adult subjects in different occupations, and found different types or structures of profiles predominating in the different occupational groups, again suggesting a possible discrepancy in the

relationships to be found. In general, Meili's results cannot be regarded as conclusive because of the relatively crude statistical techniques employed, but they are indeed suggestive.

Alexander (6), in his investigation of "practical intelligence," tested four groups, including: (1) 100 elementary school children of both sexes, (2) 71 boys in an academic high school, (3) 103 boys in a technical high school, and (4) 100 delinquent women, all over 16 years old. The same factor patterns and very similar factor loadings were found in all four groups. It is impossible to compare directly the individual correlations computed on each group, however, since only three of the tests were used in exactly the same way on all of the groups.

A comparison of separate investigations employing subjects of different age ranges and treating the data in comparable fashion again brings out variations in factor pattern. Thus the majority of the English studies, employing school children, stress an underlying general factor, with only minor group factors; whereas a large number of the American studies, employing college students, show relatively broad group factors, with the general factor playing a fairly minor rôle. Similarly, Kelley's studies (105) on school children showed, in addition to group factors, a fairly significant general factor which Kelley attributed to heterogeneity and to the verbal content of all the tests. Schiller's study (154) on third- and fourth-grade school children indicated a single, large general factor through verbal, numerical, and spatial tests, in con-

trast to similar studies on college students by Schneck (155), G. M. Smith (162, 163), and others cited above. Bryan's (27) investigation of memory on children between the ages of five and six, in which were employed a vocabulary test and the Stanford-Binet as well as 11 memory tests, again yielded only one general factor through all of the tests, whereas Anastasi's (7, 8) studies of memory on college students indicated a variety of overlapping group factors.

Finally, mention may be made of two recent investigations specifically designed to test the influence of age upon the pattern of trait relationships. Garrett, Bryan, and Perl (84) tested three groups of children, 9, 12, and 15 years of age, respectively, with six memory tests as well as tests of speed, verbal, numerical, and spatial abilities. The intercorrelations among these tests tended to decrease with age, as illustrated by the average intercorrelations of .29, .26, and .14 for the three age groups. Factor pattern analyses indicated a large general factor whose weight decreased consistently from 9 to 15. An examination of the variability of the three groups showed that differences in this could not account for the decrease in correlation found. Asch (10), in an effort to investigate age changes in mental organization within the same subjects, retested 161 of the 395 children in Schiller's study (154) three years after the original testing, using eight verbal, numerical, and spatial tests selected from the original series. The average ages of the subjects were approximately 9 and 12 on the two occasions. Intercorrelations showed a drop from the first to the second test-

ing, this decrease being greater in correlations between verbal and numerical tests than in those within the verbal or numerical groups. Factor pattern analyses brought out the same points, and thus this study again suggests an increasing specialization of performance with age.

It would seem, therefore, that recent better-controlled studies have demonstrated more and more the importance of a fact only casually noted at the outset, namely, that mental organization is very largely a function of the particular population under consideration. Nor can this fact be evaded by lumping all populations and seeking a sort of "universal" mental organization in a random and highly heterogeneous sampling, even if such a procedure were feasible and desirable from a practical standpoint. If definite differences in mental organization are demonstrated between groups differing in specific known characteristics, such as age, educational, occupational, or cultural status, these differences should not be ignored nor ruled out, but should themselves be investigated for the light they may throw on the nature of mental organization. The time seems ripe to turn from the investigation of the existence of relationships to the experimental study of the causes of relationship.

II

DESCRIPTION OF THE PRESENT STUDY

A. GENERAL PLAN OF THE EXPERIMENT

The specific object of the present study was to investigate the possibility of "producing" experimentally a factor pattern other than that originally found in a given group of subjects. This problem may be approached from various angles. Mental organization may become altered in the course of the individual's everyday experiences, and particularly in the course of school instruction. Hence one approach to the problem might be the retesting of a group of children at different ages and academic levels. The interpolated experimental factor in such a set-up would be the sum total of the subject's intervening experiences. A disadvantage of this method is that the experimenter has no control over the intervening experience of the subject and little knowledge of it. A further and probably more serious disadvantage, from the standpoint of theoretical implications, lies in the fact that such a procedure can throw no light upon the relative significance of maturational and experiential factors in bringing about the change.

A second approach would be through a study of the influence of practice upon the interrelations of the functions tested. The relevant data on this problem suggest that the relative weights and location of the various factors will, indeed, change in the course of practice. In this case, however, the situation is complicated by the marked increase in variability as well

as the rise in reliability coefficients during practice.⁴ The influence of these changes in variability and reliability upon the intercorrelations is so pronounced as to obscure any other independent modifications in factor pattern which might result directly from the practice.

A third approach is to be found in the study of transfer of training. The subjects could be trained in one function related more or less closely to some or all of the other functions tested; the intercorrelations among the untrained functions before and after the related training could then be compared. Group factors of varying extent could be produced, depending upon the number of functions affected by the transfer and upon the subjects' differential susceptibility to such transfer. With this technique, however, it is impossible definitely to establish a priori, and difficult to determine even a posteriori, just which functions are affected by the interpolated training. The function to be trained may have been selected because of its community of material with certain of the other functions tested. But it may also exhibit a certain community, in other respects, with any number of the other tests employed. Furthermore, such community, which determines the extent and direction of transfer, may vary with the individual. The experimenter cannot ascertain what is occurring to his individual subjects

⁴For a fuller discussion of this problem, cf.: Anastasi, A. Practice and variability. *Psychol. Monog.*, 1934, 45. Pp. 55. Cf. also: The influence of practice upon test reliability. *J. Educ. Psychol.*, 1934, 25, 321-335.

during the training period. One individual may develop a technique as a result of the training, which will carry over and improve his performance on one particular test *X*; another individual, exposed to the same training, may develop a different technique which may hinder his performance on test *X*, or may leave his performance on test *X* unchanged and affect his performance on another test *Y*. A certain gross effect can be established by means of this technique, but the exact nature of the influence or influences operative in bringing about the changes in interrelation among the tests would remain obscure.

The fourth method to be considered brings us a step closer to the understanding and direct control of the influence producing the change. This method depends not upon a prolonged period of training but upon some specific experience in which the subjects are given definite information or techniques that will be of assistance in some of the tests but not in others. The techniques presented can be made sufficiently specific so as to be definitely limited in the extent of their application. Rather than depend upon the various techniques haphazardly developed by the subjects in the course of the successive repetitions of a test, the experimenter himself furnishes the techniques. Thus, by this method, a more direct control is exerted over what occurs in the course of the experiment than by any of the other methods. At the same time, this set-up is more similar to what actually occurs in everyday life than either the practice or transfer methods, since the subjects are given instruction, which to most indi-

viduals is a more natural situation than repetition without comment. Finally, it will be noted that, with the method of "specific techniques," the effect of maturational factors is reduced to a minimum. The initial and final tests can be administered within a very short interval, thus reducing growth changes to a negligible quantity. In each of the other methods, on the other hand, the interpolated influences must operate over a much longer period in order to produce appreciable effects.

It should be pointed out that the differences among the four methods described above are not fundamental. The difference between practice and transfer is obviously one of degree only. Likewise, school instruction is essentially a means of improving performance along given lines, and in this respect its fundamental similarity to practice, transfer, and the "specific techniques" set-ups is apparent. The differentiation made above is based simply on the relative degree of control which can be exerted over the intervening influences, as well as the degree to which the nature and extent of these influences are known to the experimenter.

A question which enters into any investigation of this sort concerns changes in the nature of the tests in the course of the experiment. These changes must occur, regardless of the method employed. It is obvious that any intervening experience which is sufficiently relevant to alter the relationships of a test with other tests must also alter the specific nature of that test for the particular individual. This problem can easily become a *reductio ad absurdum*. It is well known that the na-

ture of a test usually changes in the course of successive repetitions, as in a practice experiment. To a slighter degree, a single repetition will alter the stimulus value of a test for the subject. Similarly, a code learning test administered for the first time to a third-grade child and to a college student will not call into play the same processes. Thus no test can remain unaltered for the same individual on any two occasions.

It may be objected that, if the nature of the test is altered, then we should hardly expect the correlations of this test with others to remain unchanged, since different processes are being measured. This question is closely tied up with the essential meaning of mental organization. If mental organization refers only to the observed relationships among particular groups of behavior manifestations, then it must change as the nature of the tests changes. It would indeed be futile to attempt to prevent or "rule out" such changes in the tests, since similar changes must and do occur in everyday life as the subject's experiences accumulate. The problem with which we are concerned might be reworded as follows: What effect do the changes in the nature of tests or of the stimulus value of objects, which must of necessity occur in the course of the subject's life, have upon mental organization? Our contention is that if a change in factor pattern is revealed by the set-up of the present experiment, then similar changes will be found to occur in the course of the subject's life. In all cases, the specific nature of the test will change; if this causes a change in factor pattern in our set-up, it will likewise cause such a change in other

situations. This problem will be discussed further, with specific reference to the findings of the present study, in Section *C* of Part IV .

B. SELECTION AND CONSTRUCTION OF TESTS

Five tests were employed in the present experiment. The tests were selected so as to include verbal, numerical, and spatial material and to call into play a variety of different processes. The attempt was likewise made to include tests which were not too highly correlated with each other at the start in the population tested. All of the tests were specially constructed for use in the present experiment, although some of the materials were taken from available tests. The tests were tried out on a group of 20 sixth-grade school children of both sexes, attending different schools and varying widely in scholastic ability. Final details of directions, timing, etc., were adjusted on the basis of the preliminary testing on this group. The children in the preliminary group were tested by the writer in small groups of not more than four each, and comments were obtained very freely from these subjects upon completion of the tests. It was thus possible to make very detailed observations on each child's reactions to the tests.

The tests finally selected include vocabulary, digit span, pattern analysis, verbal reasoning, and code multiplication. Parallel forms of all of these tests were administered in the initial and final test periods. The designation *A* will henceforth be used to refer to a

test administered in the initial period and B , one administered in the final period. All tests except vocabulary were constructed in four parallel forms, A_1 , A_2 , B_1 , and B_2 . Of these, A_1 and A_2 , and B_1 and B_2 , respectively, were administered in immediate succession; reliability coefficients for initial and final tests were computed by correlating A_1 with A_2 , and B_1 with B_2 . All of the tests except digit span were litho-printed⁵ on two-page booklets, the printed matter appearing only on the inside of each booklet; subjects kept booklets closed until told by the experimenter to open them. A description of each test follows.

1. *Vocabulary*: Each of the two parallel forms of this test consisted of 50 words, with five alternatives following each word. The subjects were instructed to underline the one word which meant the same or most nearly the same as the given word in each case. Two examples with easy words preceded each form. All of the words were taken from lists given by Thorndike in *The Measurement of Intelligence* (236, pp. 180-192), from which the words finally included in the CAVD had been selected. Thorndike gives the percentage of correct responses to each word made by groups of 6A and 6B children in New York City schools. By means of these percentages, two lists of approximately equal difficulty were drawn up by the writer, and the words in each list were arranged in order of difficulty. A wide range of difficulty was covered, the percentages passing each item varying from about 10 per cent to 95 per cent for each list. The time limit for each form was 25 minutes. The score was the total number of correct items. Separate scores were also found on the odd and even items, from which the reliability of each form was computed by the split-half technique.

⁵By the National Process Co., N. Y. C.

2. *Digit Span*: This was a test of immediate memory span for visually presented digits and was constructed in the four parallel forms, A_1 , A_2 , B_1 , and B_2 . Each form consisted of nine series of digits ranging from a 3-digit to an 11-digit series. The following rules were observed in constructing the series: zero was omitted; three or more digits were never given in their natural or reverse order; no digit was repeated in a series containing nine digits or less; in those series containing over nine digits, the same digit was never used in immediate succession, and the series never began and ended with the same digit; care was taken to avoid any familiar combinations, such as historical dates. The materials consisted of black two-inch numbers⁶ glued onto white cardboard cards. Exposure time was determined by a metronome, one second being allowed for each digit on the card. Subjects were supplied with mimeographed data sheets to record their responses. A sample card with a three-digit series was employed as demonstration material before the A -testing and the B -testing. The score was the "basal span" plus one point for each additional correct list beyond it.⁷ The score on the A -testing was the average of the span on A_1 and A_2 , and a similar method was followed in the B -testing.

3. *Pattern Analysis*: Each of the four parallel forms of this test (A_1 , A_2 , B_1 , B_2) contained 11 different designs, as well as a sample design. The key, appearing at the top of the page, consisted of six $\frac{1}{4}$ -inch squares, one black, one white, and the remaining four divided diagonally into a black and a white half in different positions; each square was paired off with a number from one to six. The subjects were told that all of the designs were made out of the blocks at the top of the sheet, and they were to fill in the

⁶Wilson's gummed numbers, No. P33, supplied by the Tablet & Ticket Co., N. Y. C.

⁷This is the scoring technique suggested as giving the highest reliability by Peatman, J. G., & Locke, N. M., in Studies in the methodology of the digit-span test. *Arch. Psychol.*, 1934, No. 167. Pp. 35.

correct number corresponding to each block which made up the design. A square ruled into blank spaces was provided under each design, and was to be used in recording the responses. The first seven designs were made up of three rows of three squares each, the last four, of four rows of four squares each. A large number of different designs had been tried out individually on a small group of adults, and each subject was timed on each single design to determine roughly their relative difficulty. The rule was also applied that the more "compact" a design, the more difficult it is to break it up.⁸ On the basis of these three considerations, viz., size, speed of completion by individual adult subjects, and degree of compactness, the drawings within each form were arranged in order of difficulty. The sample design on each form was used, in conjunction with a large chart, as demonstration material. Very detailed directions were given about taking designs in order, working along each row of squares from left to right within each square, etc. The time limit on each form was *six minutes*. The score was the total number of squares correctly filled in; thus the subject received one point of credit for any square within a design which contained the correct digit, regardless of the correctness of the design as a whole. The maximum score possible on each of the four forms was 111, the maximum on combined *A* or *B* forms being 222.

4. *Verbal Reasoning*: Each of the four parallel forms of this test (A_1 , A_2 , B_1 , B_2) consisted of nine reasoning problems and one sample problem. They were all expressed in verbal terms and were of the conventional syllogistic types. Every question could be definitely answered *yes* or *no* on the basis of the given information. The first three problems of each form consisted of two given statements and two conclusions; the fourth and fifth consisted of three statements and three conclusions; the last four consisted of four statements and four conclusions. In addition,

⁸Cf. Foley, J. P. The effect of context upon perceptual differentiation. *Arch. Psychol.*, 1935, No. 184. Pp. 67.

the difficulty of the items was increased in the latter part of the test by employing letters rather than proper or common nouns to designate the objects involved. The subjects were told to encircle *yes* after a conclusion if it followed from the given facts and *no* if it were incorrect. Elaborate demonstrations with three problems of increasing difficulty, in addition to the printed sample on the test sheets, were given. The time limit for each form was *four and one-half minutes*. Scoring was based on the number of individual responses correct, i.e., if a subject completed a four-conclusion problem correctly, he received four points. The score on each form was the total number of correct responses minus the total number of wrong responses. The maximum possible score on each form was 28; the maximum on combined *A* or *B* forms was 56.

5. *Code Multiplication*: Each of the four forms of this test (A_1 , A_2 , B_1 , B_2) consisted of 19 multiplication problems and one sample problem. All were multiplications of a three-place by a one-place number, and were presented in "code," simple geometrical figures being used in place of digits. The key was printed at the top of each sheet and consisted of star, triangle, square, cross, ellipse, diamond, circle, rectangle, crescent, and hexagon paired with digits from 0 to 9, respectively. No digit was repeated within the same three-place number. The digits 0 and 1 were never employed as multipliers. The problems were arranged roughly in an increasing order of difficulty, on the basis of the following considerations: problems yielding a three-place product are easier than those yielding a four-place product; higher digits either in the multiplicand or multiplier increase the difficulty of the problem; "carrying" makes a problem more difficult; and, finally, two-place products are more difficult to handle when they occur at the right or center of a number than when they occur at the first place to the left. The subjects were instructed to work out each problem "mentally" and write the answer, expressed in digits, in the answer space. Demonstrations were given with the aid of a chart as well as the sample problem at the top of each sheet. The time

limit for each form was *three minutes*. The score was the total number of problems correct, the maximum possible on each form being 19, and the maximum on combined *A* or *B* forms, 38.

C. SPECIFIC PROCEDURE

The general schema of the present experiment consisted of three periods which were identical for all subjects. These were: (1) initial testing, (2) interpolated instruction, and (3) final testing. All testing, as well as instruction, was conducted by the group method, with classes of from 37 to 46 children. The *A* forms of the five tests were administered on two successive days, all subjects taking vocabulary and digit span on the first day and pattern analysis, verbal reasoning, and code multiplication on the second. This arrangement was employed so as not to test any subjects for more than one hour during a day, and thus prevent any marked fatigue, loss of interest, etc., which might set in. On the third day, special instruction was given on pattern analysis, verbal reasoning, and code multiplication. Thirteen days after the initial testing, the *B* forms of all five tests were administered, in the same order and in exactly the same way as in the initial testing. This schedule has been summarized in Table 1. The experiment was conducted at the beginning of the Spring semester of the academic year 1934-1935.

The instruction consisted of describing to the subjects a specific technique which could be employed to facilitate performance on each of the three tests indicated. The techniques were described orally by the experimenter with the aid of blackboard demonstra-

TABLE 1
SCHEDULE OF THE EXPERIMENT

Initial testing

Wednesday, February 6: Vocabulary A ; Digit span A_1, A_2 .

Thursday, February 7: Pattern analysis A_1, A_2 ; Verbal reasoning A_1, A_2 ; Code multiplication A_1, A_2 .

Instruction

Friday, February 8: Pattern analysis; Verbal reasoning; Code multiplication.

Final testing

Tuesday, February 19: Vocabulary B ; Digit span B_1, B_2 .

Wednesday, February 20: Pattern analysis B_1, B_2 ; Verbal reasoning B_1, B_2 ; Code multiplication B_1, B_2 .

tion material. The experimenter illustrated the application of each technique in specific examples, employing material similar to that of the tests themselves. The subjects, however, did nothing but observe during this period and were given no practice in the tests. The instruction for each of the three tests was given during a single hour, and the same sequence was followed with all subjects. The specific techniques given to the subjects were, briefly: (1) for pattern analysis, the division of the design into squares by drawing lines upon the design itself before filling in the digits; (2) for verbal reasoning, the arrangement of the objects or symbols in the problem into a diagram in which the given relationships are indicated spatially; and (3) for code multiplication, the filling in of digits corresponding to each geometric form, before multiplying.

Since the instruction constitutes a very fundamental aspect of the present experiment, the exact instruction given to the subjects for each test has been reproduced below.

Instruction

General introduction.

Now I'm going to teach you a few simple things you can do to help you do better on the tests you have taken. You did very well, but I'm going to show you how you can do still better. If you listen carefully, you will be able to do much better when you take the test a second time.

1. *Pattern analysis.* (A key and two sample designs, one 3 x 3 and one 4 x 4, have been drawn on the blackboard beforehand.)

Let's take first the design test. Here is a simple design (point). It will be much easier to do if we draw lines right on the design, to show where the blocks go. This design is made up of three rows of three blocks each, so we will divide it into three parts this way (draw vertical), and then we divide it into three parts this way (draw horizontal). Now, you see how much easier it is.

The first block is all black, so what number should it have? . . . Yes, it is number 2, so we write 2 in the space below the black. The next block is all white, so what number should it have? . . . Yes, it should be number 4, so we write number 4 in the next space. The next is all black, so what number should it have? . . . Yes, number 2 again, so we write 2 here. Now look at the second row. The first block is black and white, with the black at the upper left hand corner, so what number should it have? . . . Yes, number 3, so we write a 3 in the first space. The next is all white, so what number do we write here? . . . Yes, number 4. The next is black and white with the black at the upper right-hand corner, so what number do we write? . . . Yes, number 6. Look at the third row. What

number is the first block? . . . Yes, so we write 1 here. What number is the next block? . . . Yes, so we write 4 here. And the last is what? . . . Yes, it is 5.

If we have a larger design, made up of four rows of four blocks each, we can still divide it up the same way. Look at this example. This time we draw lines to divide the design into 4 parts this way, and then we draw lines to divide it into 4 parts this way.

The first block is all white, so what number should it have? . . . Yes, number 4, so we write 4 in the space under it. The next is black and white with the black at the lower left-hand corner, so what number should it have? . . . Yes, 1, so we write 1 in this space. The next is black and white with the black in the lower right-hand corner, so what number do we write? . . . Yes, 5. The next is all white, so what do we write? . . . Yes, we write 4. Look at the next row. The first is black and white, with the black at the upper right-hand corner, so what do we write? . . . Yes, 6. The next is all black, so we write 2, and the next is also black, so we write 2 again. The last is black and white with the black in the upper left-hand corner, so what do we write? . . . Yes, 3. Look at the third row. What number is the first block? . . . Yes, so we write 5 here. The next is what? . . . Yes, so we write 2; and the next is also 2. The next is what number? . . . Yes, so we write 1. Look at the last row. What is the first number? . . . Yes, 4. And the next? 3 . . . and the next? 6 . . . and the last is what? . . . 4.

When you do this, you want to be sure to draw the lines in only one design at a time, otherwise you will get mixed up. You must always finish each design completely, fill in all numbers in each design, before you go to the next design.

2. *Verbal reasoning.* (The three problems have been written on the blackboard beforehand.)

Now, let's take the sentence test. Look at this example:
Tom is taller than George. Tom is taller than Bill.
George is taller than Bill. Bill is the shortest of all.

We can make a little design on the side here, which will help us decide if we can say these things or not. Tom is taller than George, so we put him ahead of George in the diagram, like this. . . . George is taller than Bill, so we put Bill under George in the diagram. To save time, we can use the boys' initials instead of their full names, like this. . . .

Now, we can answer the questions at the right-hand side without any trouble. "Tom is taller than Bill." The answer is *Yes* because Tom is ahead of Bill in our diagram. "Bill is the shortest of all." The answer is *Yes*, because Bill is at the bottom in our diagram.

Let's look at the next example:

Town A is north of town B, so we put A above B in the diagram.

Town B is north of town C, so we put C below B in the diagram.

Now we're ready to answer the questions: "Town B is in the middle. . . ." The answer is *Yes* (point to diagram): "Town C is north of town A." The answer is *No* because A is north of C in our diagram.

Here is a much more difficult example:

If we are told this:

B is as sharp as M.

L is sharper than M.

S is less sharp than B.

C is sharper than L.

Then we can say:

L is sharper than S.

C is less sharp than B.

M is sharper than C.

M is sharper than S.

B is as sharp as M, so we put them next to each other, like this B-M. L is sharper than M, so we put it ahead of M; S is less sharp than B, so we put it *under* B; C is sharper than L, so we put it ahead of L.

Now we're ready to answer the questions on the right-hand side:

"L is sharper than S." *Yes*, because it's above S, ahead of S in our diagram.

"C is less sharp than B." *No*, because C is *above* B in the diagram, which means that C is sharper than B.

"M is sharper than C." *No*, because M is below C in the diagram, which means M is less sharp than C.

"M is sharper than S." *Yes*, because M is above S in the diagram.

When you make these diagrams, you must always make *only one* at a time. Finish *all the answers* to the example you are doing, before you even look at the next example. It is very important to do only one example at a time, or you'll get all mixed up.

3. *Code. multiplication.* (The key and two sample problems have been drawn on the blackboard beforehand.)

Now, let's take the multiplication test. In this test, the work will be much easier if we *fill in the numbers* in each example as we come to it, and then multiply.

For instance, in this first sample: we fill in the number we multiply by, which is 2; then we look up the next number; what is the next number? Yes, 4, so we write 4 inside the oval, here. The next is what? Yes, 3, so we write 3; the next number is 1, so we write in 1. Now, we are ready to multiply. 2×4 equals 8, so we write 8 in the answer space; 2×3 equals 6, so we write 6 next to 8; 2×1 equals 2, so we write 2; the answer is 268.

Look at the second example: What number is this? Yes, so we write in 4; what number is this? Yes, so we write in a 9; and what number is in the square? Yes, so we write in 2. What number is this? Yes, so we write in 5. Now we can multiply: 4×9 equals 36, we put down 6 and carry 3; 4×2 equals 8, plus 3 equals 11; 4×5 equals 20 plus 1 equals 21. So the answer is 2116.

You want to be sure to get the answer to the first example before you fill in the numbers in the second, and get the answer to the second before filling in the numbers in the third, and so on. Finish each example completely before you even think of the next one.

All of the testing and instruction was done by two

experimenters, selected because of their training and previous experience in testing children and their familiarity with the school situation. Each group of subjects had the same experimenter throughout, for testing as well as instruction. Each of the two experimenters tested three groups in one day. The hours of testing, total size of group, and experimenter have been indicated in the daily schedule presented in Table 2 below. The same schedule was followed for the *A* and *B* testing and for the instruction; thus any one group always worked on the same hour on all of the days of the experiment. The number of cases given in Table 2 represents the total number in each section, not the number retained in the final treatment of results.

TABLE 2
DAILY SCHEDULE OF EXPERIMENT

Hour	Experimenter L. D. Section	Total N	Experimenter A. L. Section	Total N
10:30-11:30 A.M.	6B1	46	6B3	41
11:30-12:30 A.M.	6B2	38	6B4	41
1:30- 2:30 P.M.	6A-6B	37	6B5	38

D. SUBJECTS

Children were selected as subjects in the present experiment because of their greater susceptibility to instruction and the smaller likelihood of their employing the special devices during the first trial, before instruction. The children could not, however, be below a certain age level as they would then be unable to take tests sufficiently complex for the purposes of the

present experiment. The subjects employed were all sixth-grade school children attending Public School 167, Brooklyn, New York. A total of 241 children were tested. Of these, 41 were omitted from the final treatment of results for the following reasons: absence from one or more tests or from instruction period, 34; misunderstanding directions on one or more tests, 3; both reasons combined, 4. Each subject filled out a mimeographed data sheet, giving name and section, sex, date of birth, birthplace, father's and mother's birthplace, and father's occupation. The subject also indicated whether he spoke any language other than English, and what language was spoken most of the time at home.

Each child had also been tested in the course of the regular school routine with either the National Intelligence Test or the Haggerty Delta 2. The scores on these tests had been transmuted into IQ's and recorded in this form for each child. In view of the fact that the same test was not employed on all of the children, and that some of the original records were not available, the intelligence test scores have been reported in terms of IQ. The error introduced by the use of an IQ estimated from such group tests is not very serious from the standpoint of the present study, since these measures of "intelligence" do not enter into the treatment of results but are given only as an additional characterization of the subjects employed.

The data from both individual data blanks and intelligence tests are presented in Table 3 below. Only the 200 subjects retained in the final treatment of results are included in this table. It will be noted that the

TABLE 3
DESCRIPTION OF SUBJECTS

Age in months			IQ		Birthplace		Subject	Father	Mother
Mean	136.38	Mean	117.45		U. S. A. or Canada		192	62	78
S.D.	8.60	S.D.	17.96		Russia, Poland, Lithuania		1	79	71
Range	122 to 176	Range	67 to 171		Austria, Hungary			20	14
Section	Male	Female	Mean age	Mean IQ	Balkans		1	3	5
						Germany	4	7	9
6B1	22	14	127.53	137.31	Italy			13	9
						England, Ireland	2	6	8
6B2	20	10	143.43	100.34	Sweden			1	1
6B3	19	19	136.03	123.31	Turkey			1	1
6B4	16	19	137.40	113.80	Porto Rico			1	2
6B5	16	14	139.37	109.53	Unknown			7	3
6A-6B	14	17	137.48	112.40					
Total	107	93							
Familiarity with language other than English			Language spoken most of the time at home		Father's occupation (Tausig Scale)				
None			English		189	1. unskilled			0
Jewish	57		Jewish			2. semi-skilled			17
German	122		Italian		3	3. skilled			55
Russian	6		German		4	4. clerical			83
Italian	1		Hungarian		1	5. professional			31
Swedish	9		Spanish		2				
Hungarian	1				1				
Spanish	2					none specified			15
	2								

mean age of this group is 11 years, 5 months, with an S.D. of 8.60 months and a range from 10 years, 2 months to 14 years, 8 months. The mean IQ is 117.45, with an S.D. of 17.06 and a range from 67 to 171. The group as a whole is thus above average in IQ, a condition which is to be expected, as the school is in a neighborhood rated above average in social status. The group is quite evenly divided as to sex, consisting of 107 boys and 93 girls.

In the comparison of the six sections, the system of ability grouping employed in the New York public schools should be kept in mind. According to this system, the brightest pupils are placed in section 1, the dullest in section 2, and the average in section 3. When additional sections are added, the same arrangement is followed as nearly as possible with the successive numbers. In the present group, however, the last three sections, 6B4, 6B5, and 6A-6B, were all fairly mediocre groups as judged by the standards of the school as a whole. The mean ages and mean IQ's of the six sections corroborate the ability grouping, although it will be noted that the "dull" group, 6B2, has a mean IQ of 100.34 and the "average" 6B3 group has a mean IQ of 123.31, again indicating the superiority of the group as a whole to the general age norms.

With but a few exceptions, the children were all American born. The majority had either American-born or Russian-born parents; a small number gave Austria, Hungary, or a Balkan country as their parents' birthplace, and a still smaller number, Italy or Germany. Of the entire group, 57 reported no familiarity

III

ANALYSIS OF ISOLATED VARIABLES

A. CENTRAL TENDENCY, VARIABILITY, AND RELIABILITY

The means, standard deviations, and reliability coefficients of each of the five tests, before and after instruction, are presented in Table 4. It will be recalled that the reliability coefficients of all of the tests except vocabulary were computed by correlating scores on parallel forms administered in immediate succession; the reliability of vocabulary was computed by the split-half technique, the two scores being based on odd and even items, respectively. All of the coefficients reported in Table 4 give the reliability of the whole test, estimated by the Spearman-Brown formula.

TABLE 4
MEANS, VARIABILITY, AND RELIABILITY COEFFICIENTS

Variable	Mean	S.D.	Range*	Reliability coefficient
<i>A</i> -testing				
1. Vocabulary	21.9300	5.6670	8 - 39 (50)*	.8433
2. Digit span	6.8200	.9913	3.5- 10 (11)	.6386
3. Pattern analysis	88.4000	34.7084	11 -174 (222)	.8948
4. Verbal reasoning	14.7900	9.0020	1 - 36 (56)	.7037
5. Code multiplication	17.7350	4.9734	6 - 32 (38)	.8164
<i>B</i> -testing				
1. Vocabulary	25.2100	5.8631	10 - 40	.8423
2. Digit span	7.2600	1.1067	3.0- 10	.7554
3. Pattern analysis	147.5750	36.5199	62 -250	.9231
4. Verbal reasoning	23.9700	11.2977	1 - 44	.7785
5. Code multiplication	20.1500	5.7513	3 - 36	.8785

*Highest possible score given in parentheses; this is identical in the *A*- and *B*-testing.

It will be noted that all of the means increase from the *A*-testing to the *B*-testing, although the gain in the

two tests in which no intermediate instruction was given, viz., vocabulary and digit span, was slight. Of the three tests in which instruction was given, pattern analysis and verbal reasoning show very marked gains, the means in the *B*-testing being nearly twice as large as in the *A*-testing. In code multiplication, however, the gain was much smaller. The reason for this is probably to be found in the nature of the test itself. Facility in multiplying, a highly practiced function to begin with, plays a relatively large part in the code multiplication test. Hence there is less room for improvement in the test as a whole, and the use of the special device described in the instruction will not raise the scores as much as in the other tests. The previous school training of the subject has much less effect on his performance in pattern analysis and verbal reasoning. It might be noted, furthermore, that the code multiplication test proved relatively easier for the subjects at the outset, the mean scores being much higher in relation to the maximum than in either of the other two tests.

An examination of the ranges for each test will show that the subjects were allowed adequate room for improvement in all of the tests, as no one reached the maximum either before or after instruction. The standard deviations, in contrast to the means, show very little rise from the *A*- to the *B*-testing. A very slight uniform rise is found in all of the standard deviations, and this rise is no greater in the three tests in which instruction was given than in the other two tests. Differences in intercorrelation between the *A*- and *B*-test-

ing cannot therefore be attributed to changes in variability. The reliability coefficients, likewise, show either no change or a slight rise in all of the tests, and seem not to be influenced differentially by the interpolated instruction. The largest increase, in fact, occurs in the reliability coefficient of the digit span test, in which no instruction was given. We may conclude, therefore, that the interpolated instruction, although raising the means markedly, had no appreciable effect upon the variability of the group or upon the reliability of the tests, over and above what would be expected simply from the repetition of a parallel form of the same test.

B. RELIABILITY OF GAINS

In Table 5 will be found a more detailed evaluation of the gains made on each test from the *A*- to the *B*-testing. It will be noted that the differences between the *A* and *B* means are all perfectly reliable when evaluated in terms of the standard error of the difference, the critical ratios ranging from 6.35 to 29.15. In general, the critical ratios are larger for the tests in

TABLE 5
RELIABILITY OF GAINS

Variable	Mean gain	r_{AB}	σ_{M_A}	σ_{M_B}	$\sigma_{diff.}$	Critical ratio
1. Vocabulary	3.2800	.7101	.4007	.4146	.3106	10.56
2. Digit span	.4400	.5679	.0701	.0783	.0693	6.35
3. Pattern analysis	59.1750	.6736	2.4543	2.5824	2.0298	29.15
4. Verbal reasoning	9.1800	.5620	.6365	.7989	.6868	13.37
5. Code multiplication	2.4150	.6775	.3517	.4067	.3087	7.82

which instruction was administered, although the critical ratio of code multiplication is smaller than that of vocabulary. This can be accounted for by the fact that the special device employed was not as effective in producing improvement in code multiplication as in the other two tests, for the reasons given above.

A survey of the number of individual subjects whose scores improved in each test will throw further light upon the mean gains reported. These data are to be found in Table 6. It will be seen that the number who

TABLE 6
ANALYSIS OF CHANGE FROM *A*- TO *B*-TESTING IN INDIVIDUAL
SCORES

Variable	Number of cases gaining	Number of cases remaining constant	Number of cases losing
1. Vocabulary	140	16	44
2. Digit span	111	39	50
3. Pattern analysis	197	0	3
4. Verbal reasoning	161	5	34
5. Code multiplication	139	19	42

gained is larger in the "instruction" tests than in the "non-instruction" tests, the mean numbers being 166 and 126, respectively. The mean number whose scores dropped is 26 in the instruction tests and 47 in the non-instruction, and the mean numbers whose scores remained constant are 8 and 28, respectively. As would be expected, code multiplication shows a smaller number improving and a larger number either losing or unchanged than either of the other two instruction tests.

The correlations given in Table 5 are uncorrected correlations between the total scores in the *A*- and *B*-testing. These correlations are all positive and quite

high, indicating a marked tendency for the subjects to maintain the same relative standing in the *A*- and *B*-testing. The highest correlation is obtained with vocabulary, a non-instruction test. The correlation of digit span, however, is lower than those of two of the instruction tests and only negligibly higher than that of the third. This discrepancy in the case of digit span may be attributed to the lower reliability of this test. When the coefficients are corrected for attenuation, the correlations for vocabulary and digit span are .8425 and .8176, respectively; those for pattern analysis, verbal reasoning, and code multiplication, .7412, .7594, and .8000, respectively.

C. FORM OF THE DISTRIBUTIONS

Practice or special training may alter the form of the distribution of test scores, either producing a piling of scores at the upper end or less frequently changing the "flatness" or kurtosis of the curve, even though leaving its symmetry undisturbed. Such changes in the distribution curve might in themselves affect the intercorrelations of the tests. Accordingly, the distributions of each of the five tests in the *A*- and *B*-testing have been examined with reference to skewness and kurtosis. The relevant data have been summarized in Table 7. The measure of skewness¹⁰ employed was

$$Sk = P_{.50} - \frac{1}{2}(P_{.90} + P_{.10}), \text{ with } \sigma_{sk} = .59914 \frac{D}{\sqrt{N}};$$

$$\text{the measure of kurtosis}^{10} \text{ was } Ku = \frac{Q}{D}, \text{ with } \sigma_{Ku} =$$

¹⁰Cf. Kelley, T. L. Statistical methods. New York: Macmillan, 1924. P. 77.

.27779

$\frac{\cdot 27779}{\sqrt{N}}$. With these formulae, a significant positive

skewness indicates piling of scores at the upper end of the distribution, and a significant negative skewness, piling at the lower end. The kurtosis of the normal curve is .26315; a significantly larger value indicates that the curve is platykurtic, or flattened, and a significantly smaller value indicates that it is leptokurtic, or peaked.

An examination of Table 7 will show that none of the distributions of the five tests, either before or after the instruction period, exhibits significant skewness. In every case, the measure of skewness is well under three times its standard error. The two non-instruction tests show a negligible decrease in negative skewness from the *A*- to the *B*-testing; of the three instruction tests, pattern analysis shows a slight increase in negative skewness from *A* to *B*, verbal reasoning, a slight increase in positive skewness, and code multipli-

TABLE 7
FORM OF THE DISTRIBUTIONS IN *A*- AND *B*-TESTING

Test	Skewness	σ_{Sk}	$\frac{Sk}{\sigma_{Sk}}$	Kurtosis ($\sigma_{Ku} = .0196$)
<i>A</i> -testing				
1. Vocabulary	— .82	.6513	1.26	.2337
2. Digit span	— .14	.1141	1.23	.2677
3. Pattern analysis	—3.99	4.0729	.98	.2498
4. Verbal reasoning	+ .93	1.0528	.88	.3033
5. Code multiplication	— .26	.5190	.50	.2712
<i>B</i> -testing				
1. Vocabulary	— .60	.6415	.94	.2664
2. Digit span	— .15	.1259	1.19	.2795
3. Pattern analysis	—9.32	4.0433	2.31	.2369
4. Verbal reasoning	+3.01	1.3390	2.25	.2543
5. Code multiplication	+ .26	.6059	.43	.2995

cation changes from a very negligible negative skewness to an equally negligible positive skewness. Thus it is apparent that the interpolated instruction had no appreciable effect upon the skewness of the distributions of test scores. Not only are all of the curves "normal" within the standard error of the measure of skewness, but the slight changes from the *A*- to the *B*-testing are inconsistent in direction from one test to another. The situation is just such as would result from chance variation.

Kurtosis, likewise, shows no significant deviation from normality in any of the curves. The largest value of Ku obtained is .3033 for verbal reasoning *A*; this value is only $2.05 \sigma_{Ku}$ higher than the normal curve value of .26315 and cannot therefore be regarded as indicative of a significant platykurtosis. The smallest value of Ku , .2337, obtained for vocabulary *A*, is likewise an insignificant deviation from the normal curve value. With respect to specific changes from the *A*- to the *B*-testing, we find that the value of Ku for vocabulary changes from below to very slightly above normal, and that the value of Ku for digit span is slightly above in both *A* and *B*, increasing in *B*; in pattern analysis, Ku is slightly below normal in the *A*-testing and drops further in the *B*-testing; in verbal reasoning, it is above in *A* and below in *B*; in code multiplication, it is above in both, increasing in *B*. The results are similar to those obtained for skewness, viz., none of the curves shows significant deviations from normality and the changes are highly inconsistent.

D. MEAN SCORES AND GAINS IN EACH SECTION

In view of the fact that the children employed in the present study were grouped into sections on the basis of scholastic achievement and intelligence test scores, a comparison of the results in the different sections may prove fruitful by showing more directly how the interpolated instruction operated. In Table 8 will be found

TABLE 8
MEAN SCORE OF EACH SECTION

Section	Vocabulary	Digit span	Pattern analysis	Verbal reasoning	Code multiplication
<i>A-testing</i>					
6B1	23.14	7.07	88.97	18.14	20.72
6B2	18.13	6.17	81.17	8.77	13.63
6B3	24.97	7.17	98.16	18.95	18.97
6B4	22.23	6.64	89.86	14.20	18.69
6B5	21.77	6.82	89.67	13.70	17.67
6A-6B	18.68	6.66	80.42	13.35	15.71
<i>B-testing</i>					
6B1	28.36	7.39	151.39	28.61	25.08
6B2	20.47	6.72	141.87	14.83	15.30
6B3	28.05	7.42	155.37	29.87	21.13
6B4	24.97	7.31	149.46	24.77	20.49
6B5	24.07	7.48	146.57	25.17	19.67
6A-6B	24.03	7.16	138.61	18.19	18.00

the mean score of each section in each of the five *A* and *B* tests. It will be recalled that the most striking differences in general ability are found between sections 6B1 and 6B2, the former being the "bright" group with a mean IQ of 137.31 and the latter being the "dull" group with a mean IQ of 100.34. The other four sections are intermediate, with mean IQ's of 123.31, 113.80, 109.53, and 112.40, respectively.

When only the extreme groups are compared in mean score, very consistent results are obtained. Section 6B1 has a higher mean score than 6B2 in every test,

and in both *A*- and *B*-testing. This is in line with the general finding that, in school children of the age level employed in the present study, all mental tests tend to be positively correlated with each other when a sufficiently wide ability range is considered. When the other four groups are included, however, the relationships are not so consistent. The intermediate group 6B3, for example, has the highest mean score of the six sections in four of the five *A* tests and in three of the five *B* tests.

An analysis of the gains made from the *A*- to the *B*-testing is more relevant to the present problem. These gains are presented in Table 9. In the non-instruction tests, the results are rather inconsistent from section to section. In vocabulary, 6B1 gains more than 6B2, but the highest gain is made by 6A-6B and the lowest by 6B5, both intermediate sections. In digit span, 6B1 gains less than 6B2, the largest gain being made by 6B4 and the smallest by 6B3. In the instruction tests, the results are more consistent and can be interpreted in terms of the specific nature of the devices employed. In each of the three instruction tests, 6B1 gained more than 6B2.

TABLE 9
MEAN GAIN IN EACH SECTION

Section	Vocabulary	Digit span	Pattern analysis	Verbal reasoning	Code multiplication
6B1	5.22	0.32	62.42	10.47	4.36
6B2	2.34	0.55	60.70	6.06	1.67
6B3	3.08	0.25	57.21	10.92	2.16
6B4	2.74	0.67	59.60	10.57	1.80
6B5	2.30	0.66	56.90	11.47	2.00
6A-6B	5.35	0.50	58.19	4.84	2.29

In pattern analysis, the brightest and dullest sections gained more than any of the four intermediate sections. The relatively high gain made by the "dull" group in this test may be attributed to the difficulty which this group originally encountered in visualizing the blocks which made up the designs. The device of drawing lines on the designs, a simple enough device to apply, would thus be a greater help to the duller subjects, many of whom were very much at a loss without it. In verbal reasoning, on the other hand, the device of representing the relationships among the given elements diagrammatically is in itself somewhat difficult to apply, and hence the 6B2 group makes a relatively slight improvement in this test. In code multiplication, 6B2 makes a smaller gain than any other section. In this test, it will be recalled, the previously acquired ability in multiplication played a relatively major rôle. The use of the special device of writing numbers within each form was not of sufficient help to compensate for the duller subjects' handicap in multiplication. The results of this analysis, in general, confirm the interpretations given in Section *A* regarding the operation of the special devices in each test.

E. ANALYSIS OF THE USE OF SPECIAL DEVICES

The special devices described in the instruction period were selected because it was believed that such devices were not resorted to spontaneously by children of the age range employed. It might be added that the preliminary testing confirmed this belief. Obviously, if the majority of the group were spontaneously

to deduce and employ these various devices during the *A*-testing, the instruction would be of little avail, except possibly in equalizing the subjects and reducing individual differences. On the other hand, if the devices selected were too complex or too difficult to understand and to apply, the instruction would help only a small number of subjects and could not be expected to produce a significant change in the inter-correlations of the tests. The suitability of the particular devices selected can be determined by examining the frequency with which they were employed both before and after the instruction period.

In Table 10 will be found the number of subjects in each section whose papers gave any indication that they had employed the special device in either *A* or *B* tests. Considering first the *A*-testing, we find that in pattern analysis there is a fairly large number of subjects who employed the special device. The number reported, however, is the total number of papers in which any lines whatever were drawn on even a single design. In most of these cases, a few lines were sketched

TABLE 10
NUMBER OF SUBJECTS EMPLOYING SPECIAL DEVICE BEFORE AND
AFTER INSTRUCTION

Section	N	Pattern analysis		Verbal reasoning		Code multiplication	
		A	B	A	B	A	B
6B1	36	10	35	0	28	4	25
6B2	30	6	29	0	18	5	26
6B3	38	6	37	0	32	0	35
6B4	35	6	30	0	24	1	25
6B5	30	8	30	0	26	4	25
6A-6B	31	6	29	0	13	0	23
Total	200	42	190	0	141	14	159

in one or two designs only. In only three of the papers was there evidence of a consistent and systematic use of the device; in the remainder of the 42 papers, the lines drawn were so few or so haphazard as not to be of much help. The mean score of these 42 subjects was 99.57 with a range of 65-167, as compared to a mean of 88.40 and a range of 11-174 for the entire group. Although the mean of this group is higher, 23 of the 42 individuals fell below the mean of the entire group. The higher mean is owing chiefly to the marked advantage of the two or three subjects who used the device systematically.

In verbal reasoning there was not a single case in which the special device was employed before instruction. In code multiplication, 14 subjects, scattered more or less randomly among the different sections, resorted spontaneously to the device of filling in the numbers in the various forms before multiplying. The mean score of these 14 subjects was 19.07 with a range of 10-30, as compared to a mean of 17.74 and a range of 6-32 in the entire group. Again it should be noted that in several of the 14 papers the device was not employed systematically, and hence the number of subjects who benefited significantly from it during the *A* test is actually smaller than would seem.

Turning now to the *B*-testing, we find that the large majority of the subjects made use of the devices which had been described to them during the instruction period. All but ten of the subjects employed the special device in pattern analysis. This device was easy to apply, and at the same time its advantages were

apparent to the subjects. In verbal reasoning, the number of subjects employing the given device was smaller than in either of the other two tests. The diagrammatic scheme of relationships suggested as the special device in this test was more difficult to apply than the other two; hence the less alert subjects or those who had a vaguer conception of the nature of the test were less likely to employ it. This is supported by the fact that the device was employed by a relatively larger number of the brighter and average subjects, and a relatively smaller number of the duller. In code multiplication, 159 of the 200 subjects employed the special device. In this test, the device was easy enough to apply, but may not have been so helpful for the initially better subjects. Those subjects who were better able to concentrate on the task and were more adept at "mental" multiplication could get along without filling in numbers. Hence we find that, contrary to the results in verbal reasoning, the code multiplication test shows a relatively larger number of subjects in the "dull" sections and a relatively smaller number in the "brighter" sections, employing the given device.

IV

ANALYSIS OF RELATIONSHIPS AMONG VARIABLES

A. INTERCORRELATIONS

Although the age range of the subjects employed in the present experiment was narrow, the correlations of each *A* test and each *B* test with age were computed¹¹ and are reported in Table 11. The *A* and *B* correla-

TABLE 11
CORRELATIONS WITH AGE

Test	<i>A</i> -testing	<i>B</i> -testing
1. Vocabulary	— .2687	— .3788
2. Digit span	— .2707	— .2000
3. Pattern analysis	+ .0286	.0000
4. Verbal reasoning	— .3384	— .2974
5. Code multiplication	— .3351	— .4646

tions with age are quite similar in all the tests. In four of the five tests, these correlations are negative and low, although reliable; in pattern analysis, the age correlation is not a significant deviation from zero in either the *A*- or the *B*-testing. The predominance of significant negative correlations with age is, of course, to be expected when all children within a single school grade are tested. The younger subjects within the grade are generally the brighter and will do better on most tests; similarly, the older subjects will obtain poorer scores. It is interesting to note that the one test in which no negative correlation with age was obtained is one in which both the materials and the task are

¹¹All of the correlations employed in the present study were computed by the Columbia University Statistical Bureau.

quite new to all of the subjects and bear very little resemblance to the activities involved in school progress.

In Tables 12 and 13 will be found all of the inter-

TABLE 12
INTERCORRELATIONS* WITH AGE CONSTANT: *A*-TESTING

Variable	1	2	3	4	5
1. Vocabulary		.1572	.1215	.3912	.1965
2. Digit span	.2142		.1727	.1101	.2857
3. Pattern analysis	.1399	.2285		.2385	.2788
4. Verbal reasoning	.5079	.1642	.3006		.4000
5. Code multiplication	.2368	.3957	.3262	.5277	

*Raw correlations are above the diagonal, corrected correlations below.

TABLE 13
INTERCORRELATIONS WITH AGE CONSTANT: *B*-TESTING

Variable	1	2	3	4	5
1. Vocabulary		.1259	.0092	.3217	.1758
2. Digit span	.1578		.2374	.1827	.2590
3. Pattern analysis	.0104	.2471		.3211	.4690
4. Verbal reasoning	.3973	.2382	.3788		.2904
5. Code multiplication	.2009	.3179	.5208	.3511	

correlations among the *A* and the *B* tests, respectively. Age has been held constant in all of these intercorrelations by the partial correlation technique. The intercorrelations have also been corrected for attenuation and the corrected coefficients are given below the diagonal in each of the two tables, the raw coefficients being above the diagonal. On a group of 200 cases, a raw correlation must be at least .18 in order to be four or more times as large as its probable error. This figure can be employed roughly in evaluating the correlations in Tables 12 and 13.

An inspection of Table 12 will show, first, that none of the variables overlapped to any marked degree. It

will be remembered that the tests were originally chosen so that no two or more of them would resemble one another too closely. The existence of one or more very high initial correlations would have so overshadowed other relationships that the effects of the interpolated instruction might not have been readily discernible. The attempt was made to draw from the fields of verbal, numerical, and spatial materials in order to avoid undue overlapping of content which has been found to be a potent influence in producing group factors. The only obvious overlapping of content among the tests occurred between vocabulary and verbal reasoning, and between digit span and code multiplication; it will be noted that these two pairs of tests furnish two of the three highest correlations in the *A*-testing, the raw correlations being .3912 and .2857, respectively.

The highest correlation among the *A* tests is that between verbal reasoning and code multiplication, its uncorrected value being .4000. This correlation can best be understood in terms of the child's own attitude toward these two tests, as determined by his previous school experience. The school activity which both of these tests resemble most closely is "mental solution" of assigned problems. For several years the child has had constant training in "mental arithmetic," in which he is given a computation to perform without pencil and paper and is allowed to write only the final "answer." This is indeed quite similar to the code multiplication test, in which neither multiplicand nor multiplier is presented in written form, but both must

be visualized by the subject, the geometrical forms serving as cues. Similarly, the verbal reasoning test bears a certain essential resemblance to "mental" arithmetic *problems*, in which the element of computation is usually minimized and the correct solution depends chiefly on the child's ability to visualize the given items in their proper relations without resorting to written representation. Thus, although to the adult these two tests, verbal reasoning and code multiplication, may seem quite unrelated, for the child they prove much more similar because of their mutual resemblance to a familiar everyday school task.¹² The child who has responded more favorably and profited more from the school practice in "mental" work will thus be at an advantage on *both* tests, and this no doubt accounts for the relatively high correlation between them in the *A*-testing.

For the purposes of the present study, the most crucial data are to be found in the comparison of the intercorrelations in the *A*- and *B*-testing, as well as in the comparison of factor pattern analyses which will be presented in a subsequent section. Considering first the correlation table as a whole, we find both increases and decreases in the size of the correlations from *A* to *B*. In the correlations among the instruction tests, however, the increases outweigh the decreases, whereas the opposite is true of the remaining correlations in the table.

These facts are brought out more clearly if we group

¹²It might be added that this was corroborated by the observations of the children who served as preliminary subjects.

the correlation coefficients into the following three categories. In the first category there is only one correlation, in which both tests correlated are non-instruction tests; in this we should expect a minimum of change. In the second, we have six correlations between an instruction and a non-instruction test; in these correlations we should expect some change, probably a drop in most cases, since the instruction should cause improvement in one of the variables while leaving the other unchanged. The relationships, however, are not so simple as to produce a drop in every case, since the subject's ability in a particular non-instruction test may itself be correlated with the ability to profit from the instruction given on a particular instruction test; this would raise the correlation between the two tests from the *A*- to the *B*-testing. In the third category are to be found the three correlations among the instruction tests. In these correlations we should expect the greatest change, and this change would more likely be a rise from *A* to *B*, since the instruction for all three tests was given by the same experimenter and within a single hour. Thus the child who responds more favorably to the instruction in one of the tests would also be expected to respond more favorably to the instruction in the other tests. This does not necessarily follow, however, since the nature of the devices employed might have been such as to operate differently in different tests. For example, the better subjects might have profited more from the given devices in some tests and the poorer subjects more from those in others.

The intercorrelations have been brought together in the above three categories in Table 14. In the non-

TABLE 14
AVERAGES* OF SELECTED CORRELATIONS IN *A*- AND *B*-TESTING

Tests correlated	Correlations included	<i>A</i>	<i>B</i>
1. Non-instruction	r_{12}	.1572	.1259
2. Instruction vs. non-instruction	r_{13}, r_{14}, r_{15} r_{23}, r_{24}, r_{25}	.2165	.1974
3. Instruction	r_{34}, r_{35}, r_{45}	.3095	.3627

*Computed by means of Fisher's z -function.

instruction category, there is only the correlation between vocabulary and digit span, and this drops slightly from .1572 in the *A*-testing to .1259 in the *B*-testing. The correlations in the other two categories have been averaged by first transmuting each r into its corresponding z -value,¹³ averaging the z -values, and then transmuting the mean z into the corresponding value of r . Of the correlations between instruction and non-instruction tests, four show a drop and two a rise from *A* to *B*, the average dropping from .2165 to .1974, as was expected. Of the three instruction correlations, two show a fairly large rise and one a fairly large drop, the average rising from .3095 to .3627. This also is in line with the expected changes discussed above.

The three correlations among the instruction tests may be examined more specifically in the light of the nature of the tests and of the particular devices employed. Of the three tests, pattern analysis is most unlike the past school activities of the subjects and

¹³Cf. Fisher, R. A. Statistical methods for research workers. London: Oliver & Boyd, 1932. Pp. 175-189.

hence least influenced by past experience. Instruction in this test should therefore be more effective than in the other two; this is borne out by the much greater gain in mean score in this test. Turning now to the correlation tables, we find that both of the correlations of the instruction tests with pattern analysis rise from *A* to *B*. The correlation between verbal reasoning and code multiplication, on the other hand, drops from .4000 to .2904. This drop is understandable if we recall the analysis of these two tests, which suggested that, in so far as they both resemble "mental" problems, they are both influenced by the child's past training in such work in school. This influence is, however, virtually eliminated in the *B*-testing by the use of the special devices which enable the subject to represent the problem in concrete visual symbols, thus obviating the necessity of a "mental" solution. In the *B*-testing, the community among these three tests is determined more largely by the subject's response to the experimentally interpolated instruction, whereas in the *A*-testing it was determined chiefly by the child's response to his past school experience.

To sum up, the increase in mean correlation among the three instruction tests, especially when contrasted to the drop in the other correlations from the *A*- to the *B*-testing, suggests that there is more similarity among the three instruction tests after instruction than there was before. At the same time, the drop in the correlation between verbal reasoning and code multiplication suggests a shift in the relative weight of the common factor or factors among the three tests. This

TABLE 16
RELIABILITY OF THE DIFFERENCES BETWEEN *A* AND *B*
CORRELATIONS

Variables correlated	$r_{m^A A}$ $\pm \sigma_{r_{m^A A}}$	$r_{m^B B}$ $\pm \sigma_{r_{m^B B}}$	$r_{m^A A}$ $\pm \sigma_{r_{m^A A}}$	$r_{m^B B}$ $\pm \sigma_{r_{m^B B}}$	$r_{m^A A}$ $\pm \sigma_{r_{m^A A}}$	$r_{m^B B}$ $\pm \sigma_{r_{m^B B}}$	Critical ratio	Mean critical ratio
12	.1572 $\pm .0690$	.1259 $\pm .0696$	.3685	.0313 $\pm .0775$	.4039	.4039		.4039
13	.1215 $\pm .0697$	.0092 $\pm .0707$	.4615	.1123 $\pm .0728$	1.5426			
14	.3912 $\pm .0399$	.3217 $\pm .0634$	.3099	.0695 $\pm .0721$	.9639			
15	.1965 $\pm .0609$	.1758 $\pm .0685$	.4618	.0207 $\pm .0678$	.3053			.8120
23	.1727 $\pm .0686$	.2374 $\pm .0667$	.3526	-.0647 $\pm .0768$	.8424			
24	.1101 $\pm .0699$	.1827 $\pm .0683$	.2811	-.0726 $\pm .0837$	.8674			
25	.2857 $\pm .0649$	.2590 $\pm .0660$	.3154	.0267 $\pm .0762$	.3504			
34	.2385 $\pm .0667$	.3211 $\pm .0634$	.3197	-.0826 $\pm .0748$	1.1043			
35	.2788 $\pm .0652$	.4690 $\pm .0552$	.3798	-.1902 $\pm .0671$	2.8346			1.8055
45	.4000 $\pm .0594$	.2904 $\pm .0647$	.2871	-.1096 $\pm .0742$	1.4771			

responding critical ratios. In computing the standard error¹⁴ of the difference between two correlation coefficients both of which were obtained on the same subjects, it is necessary to take into account the fact that the correlation coefficients will themselves be correlated on successive samplings. These correlations between correlations were computed for every corresponding pair of variables in the *A*- and *B*-testing and are included in Table 16. The formula¹⁵ employed is that given by Brown and Thomson (26) and requires all of the possible intercorrelations among the variables involved. The complete set of intercorrelations among all of the *A* and *B* tests is reproduced in Table 15. This table includes the uncorrected coefficients with age partialled out which were previously presented in Tables 12 and 13, as well as the additional block of correlations in the upper right-hand quarter of the table; these latter coefficients have not been reported elsewhere, as they were employed only in the computation of correlations between correlations.

An examination of the critical ratios in Table 16 reveals the same differences, pointed out above among the three categories of non-instruction, instruction: non-instruction, and instruction tests. The drop in correlation between vocabulary and digit span from the *A*-

$$^{14} \sigma_{r_{12}-r_{34}} = \sqrt{\sigma^2_{r_{12}} + \sigma^2_{r_{34}} - 2r_{r_{12}r_{34}}\sigma_{r_{12}}\sigma_{r_{34}}}$$

$$^{15} r_{r_{12}r_{34}} = \frac{(r_{18}-r_{12}r_{28})(r_{24}-r_{28}r_{34}) + (r_{14}-r_{18}r_{34})(r_{28}-r_{12}r_{18}) + (r_{18}-r_{14}r_{34})(r_{24}-r_{12}r_{14}) + (r_{14}-r_{12}r_{24})(r_{28}-r_{24}r_{34})}{2(1-r_{12}^2)(1-r_{34}^2)}$$

to the *B*-testing is .4039 times as large as the standard error of the difference and hence very probably attributable to chance variation, the chances of a "true" difference in the obtained direction being only 66 in 100. Among the instruction: non-instruction correlations, two of the differences are well over one σ of the difference. Their mean critical ratio is .8120, which indicates that there are approximately 79 chances out of 100 of a "true" difference greater than zero. For the correlations among the instruction tests, on the other hand, the critical ratios are all larger than one, and one of them is nearly three. The mean of these critical ratios is 1.8055. The chances that the "true" difference between each of the three pairs of correlations lies in the obtained direction are approximately 87, 100, and 93 out of 100, respectively.

It might be objected that, since none of the differences is three or more times as large as its standard error, the observed changes could have occurred through chance variation alone. In respect to single pairs of correlations, this possibility must, to be sure, be admitted, since in only one case were the chances of a true difference in the obtained direction 100 in 100. It should be remembered, however, that to demonstrate that an event might have resulted by chance does not constitute a proof that it has so occurred. The differences between the *A* and *B* correlations might, of course, have been so large as to fall beyond the limits of chance variation; on the other hand, a smaller difference could still have been produced by the operation of a true experimental factor.

In the present set-up, the interpretation of the changes in correlation as "true" differences is strongly supported by the pattern and consistency of the differences obtained. The comparison of the three categories previously described, viz., non-instruction, instruction: non-instruction, and instruction, illustrates this point. Even if the change in any one single correlation be attributed to chance factors, the simultaneous change in several correlations cannot be so interpreted. The chances of a simultaneous change in two correlations from sampling errors are certainly much smaller than the chances of change in an isolated correlation. When the correlation table as a whole exhibits changes in the direction of theoretical expectation, it seems very improbable indeed that such changes might have resulted from chance.

B. FACTOR PATTERN ANALYSES

The most conclusive test of the influence of specific experience upon mental organization is to be found in the comparison of the factor patterns before and after the instruction period. Factor pattern analyses were made on the correlations in the *A*- and *B*-testing, by Hotelling's method of principal components (96).¹⁰ All of the correlation coefficients employed in the factor pattern analyses were corrected for attenuation.

¹⁰The terms "factor" and "component" will henceforth be used interchangeably. "Factor" will be employed more frequently because of its common usage and greater familiarity in psychological literature; "component" will be used more specifically when referring to Hotelling's method, since Hotelling himself has adopted the term component because of its more general connotations.

The iterative solution outlined by Hotelling was followed. The results of these analyses are presented in Tables 17 and 18 for the *A*- and *B*-testing, respectively.

TABLE 17
FACTOR PATTERN: *A*-TESTING

	k_1	k_2	k_3	k_4	k_5	Totals
Root	2.251	0.965	0.805	0.651	0.326	4.998
Percentage of total variance	45.0	19.3	16.1	13.0	6.5	99.9
1. Vocabulary	+.626	-.589	+.227	+.395	+.237	
2. Digit span	+.559	+.520	+.590	+.191	-.167	
3. Pattern analysis	+.565	+.398	-.607	+.387	+.039	
4. Verbal reasoning	+.791	-.385	-.170	-.207	-.390	
5. Code multiplication	+.776	+.203	+.009	-.514	+.299	

TABLE 18
FACTOR PATTERN: *B*-TESTING

	k_1	k_2	k_3	k_4	k_5	Totals
Root	2.171	1.064	0.802	0.570	0.396	5.003
Percentage of total variance	43.4	21.3	16.0	11.4	7.9	100.0
1. Vocabulary	+.466	+.803	-.015	+.264	+.259	
2. Digit span	+.571	-.083	+.805	-.138	+.026	
3. Pattern analysis	+.704	-.499	-.275	-.104	+.409	
4. Verbal reasoning	+.734	+.305	-.266	-.478	-.263	
5. Code multiplication	+.769	-.262	-.083	+.494	-.299	

Before interpreting or comparing these factor patterns, it will be necessary to ascertain the reliability of the successive components. Hotelling describes a method whereby one can determine the chances that

any one component in the pattern might have resulted from errors of measurement alone. The obtained value of the root k for the component in question is compared to \bar{k} , the value which would result from errors of measurement in the tests. The value of \bar{k} is determined by the reliability coefficient of the tests as well as by the obtained factor weights. The final comparison is made, not between the values k and \bar{k} themselves, but between their respective square roots, since k is of the nature of a variance, and the square root of an estimate of variance has a more nearly normal distribution than either the estimate of variance itself or some other function of it. The variance of \sqrt{k} depends only on the value of k and the size of the sampling; the variance of $\sqrt{\bar{k}}$ depends upon the obtained factor weights, the reliabilities of the tests, and the size of the sampling. The variance of the quantity $\sqrt{k} - \sqrt{\bar{k}}$ is, of course, the sum of the squares of the two individual variances. In Tables 19 and 20 will be found the values of \sqrt{k} , $\sqrt{\bar{k}}$, the differences between them, the standard errors of these differences, and the critical ratios.

An examination of Table 19 shows that for factor

TABLE 19
RELIABILITY OF PRINCIPAL COMPONENTS: FACTOR PATTERN *A*

Principal component	\sqrt{k}	$\sqrt{\bar{k}}$	$\sqrt{k} - \sqrt{\bar{k}}$	$\sigma_{\sqrt{k} - \sqrt{\bar{k}}}$	Critical ratio
1	1.5000	.9101	.5899	.07575	7.7875
2	.9823	.7448	.2375	.05017	4.7339
3	.8972	.7155	.1817	.04753	3.8228
4	.8068	.6168	.1900	.04074	4.6637
5	.5710	.5765	-.0055	.02972	-.0055

pattern *A*, the first four components are reliably established and may be regarded as "true" components. The values of \sqrt{k} for these four components are all reliably greater than the \sqrt{k} values expected from errors of measurement, the differences being from 3.83 to 7.79 times as large as their respective standard errors. The obtained values are thus too large to have possibly resulted from chance. The value of \sqrt{k} for the fifth factor is, however, well within chance variation from \sqrt{k} and is, in fact, actually smaller than \sqrt{k} . In factor pattern *B*, all of the five components are reliably established. It will be recalled that the reliability coefficients of most of the tests were slightly higher in the *B*-than in the *A*-testing. This reduces both \sqrt{k} and $\sigma^2 \sqrt{I}$ and hence may account for the generally higher reliability of the components in pattern *B*. We may conclude from the data presented in Tables 19 and 20 that five independent components are required to account for the intercorrelations of the variables in the *B*-testing, and at least four independent components for the *A* tests.

In the comparison of factor patterns *A* and *B* for the

TABLE 20
RELIABILITY OF PRINCIPAL COMPONENTS: FACTOR PATTERN *B*

Principal component	\sqrt{k}	\sqrt{k}	$\sqrt{k} - \sqrt{k}$	$\sigma \frac{\sqrt{k} - \sqrt{k}}{\sqrt{k} - \sqrt{k}}$	Critical ratio
1	1.4731	.8070	.6661	.07417	8.9807
2	1.0296	.6475	.3821	.05323	7.1783
3	.8955	.7000	.1955	.04729	4.1341
4	.7550	.5871	.1679	.03852	4.3588
5	.6293	.4924	.1369	.03231	4.2371

purpose of determining the influence of the interpolated instruction, it should be borne in mind that certain broad similarities must be present because of the method of factor analysis employed. With the method of principal components, the first component (k_1) always makes the largest contribution to the total variance, the second (k_2) makes the next largest contribution, and so on in order for successive components. Furthermore, the weights of the first component in each of the different variables must be positive if all of the intercorrelations are positive. Thus the general similarity of the two factor patterns for the *A* and *B* tests is only apparent, resulting from the method employed.

A gross comparison of the two factor patterns reveals certain major differences. In the first place, the relative weights of the first component in each of the five variables differ from *A* to *B*. Before instruction, the weight of k_1 in vocabulary was larger than in pattern analysis; after instruction, this relation is reversed, the weight in vocabulary dropping by .160 and that in pattern analysis rising by .139. This gives vocabulary the lowest loading with the first component of any test in the *B* set. The second major difference comprises all of the remaining components. Not only the relative magnitude but also the signs of the component weights differ in the *A* and *B* patterns to such an extent that the corresponding components in the two patterns cannot be regarded as being the same. There is, of course, nothing in the methods of factor analysis to insure that the same factors are being isolated in two cases, or

that if they are the same they should appear in the same order. In the present method, for example, the factors appear in order of decreasing magnitude, and hence, if the relative magnitude of two factors were to change, they would appear as different components, such as k_2 in one pattern and k_3 in another.

For a more direct analysis of the changes in factor pattern from the *A*- to the *B*-testing, it is necessary tentatively to identify the obtained components with psychological processes, phenomena, or conditions which might have brought about the given relationships in test performance. This is always a dangerous procedure, and must be regarded as yielding a plausible hypothesis rather than an established fact. The validity of the hypothesis can occasionally be checked by other criteria external to the mathematical solution, but not by mathematical means. In the present study, the evidence discussed previously regarding the subject's responses to the various tests, the relation of these tests to past experience, the exact rôle played by the instruction devices, etc., may serve to corroborate the interpretations of the factor patterns which will be offered.

In factor pattern *A*, the *first component* seems to reflect primarily the influence of the previous school experience of the subjects. The weight of this component is lowest in digit span and pattern analysis, the two tests most unlike everyday school activities. The vocabulary test is one of the best single measures of verbal ability and the latter plays a very important part in school work. The relation of both verbal rea-

soning and code multiplication to "mental" arithmetic and problem solving has already been discussed in detail. Thus the child who is better adjusted to the school situation, who profits more from school instruction and is a better all-around pupil, would be at more of an advantage on the last-named three tests than on the first two.

The *second component* has positive weights in all of the tests which involve numbers, and negative weights in the verbal tests. Defined in its most specific terms, it seems to be numerical memory, since, in all of the three tests in which it has positive weights, facility in remembering numbers plays a part. This is obviously the case in digit span, in which it has by far the largest weight. It also enters into pattern analysis and code multiplication, in both of which memorizing a numerical code facilitates performance on the test.

The *third component* in the *A* pattern seems to measure the difference between subjects who adjust readily to a new situation and are stimulated by the novelty and those who are handicapped by a novel situation and require a period of adjustment before they can do their best. This component has a positive weight in vocabulary and digit span, the two tests administered on the first day when the subjects had their first contact with the examiner. It has either a negative or a negligible weight in the remaining three tests which, it will be recalled, were administered by the same experimenter at the same hours on the day immediately following the first testing period. Thus the child who is stimulated by novelty would have become

relatively disinterested by the time the pattern analysis test is reached, on the second day.

The *fourth component* seems to differentiate between the purely "written" type of test and the "mental" tests, these terms being employed in the sense in which the child himself uses them. Regardless of how the test-maker, examiner, college student, or any other individual may respond to the tests, the child responds to the first three tests as being like the "written" work he does in school, and to the last two as being more nearly like the "mental" solution of problems which he has practiced. The child who has excelled on "written" work in school but has fallen behind in the "mental" work will approach the first three tests with more assurance and will tend to be flustered on the last two. The weights of the fourth component in the various tests strongly suggest this interpretation. It has nearly equal positive weights in vocabulary and pattern analysis, a lower positive weight in digit span, and negative weights in verbal reasoning and code multiplication. The negative weight in code multiplication, furthermore, is higher than that in verbal reasoning, code multiplication bearing a closer resemblance to the "mental" work done in school.

The *fifth component* need not be discussed since it is no larger than might have resulted from chance. It might be suggested, however, that, if it be a "true" factor, it may be linked up with spurts of effort in the curve of work, since it has positive weights in the first and last tests administered during the initial testing.

In factor pattern *B*, the *first component* seems to de-

pend more largely upon the interpolated instruction than upon the subject's past school experience. The weights of this component are now largest, and nearly equal, in the three instruction tests; the weight in digit span remains approximately unchanged and that in vocabulary drops markedly.

The *second component* can be most accurately described as verbal ability. It has positive weights only in vocabulary and verbal reasoning, its weight being much higher in the former than in the latter. Vocabulary tests having been generally found to be the most adequate single measure of that which is common to verbal tests, there seems to be little doubt about the designation of this factor. It should be noted that in factor pattern *A*, no verbal factor was found other than the first factor. In that case, the verbal factor was so closely bound up with the subject's susceptibility to school instruction that the two could not be differentiated. In pattern *B*, on the other hand, the first and general factor is of a different nature and is no longer tied up with verbal ability, the latter now appearing as a second independent component.

The *third component* in pattern *B* can be none other than that which was described above as numerical memory, but it now has a positive weight only in the digit span test. The special devices described to the subjects during the instruction period have eliminated the need for memorizing the code in either pattern analysis or code multiplication. Hence this factor no longer contributes positively to these two variables.

The *fourth component* suggests the previously men-

tioned possibility that different subjects might be differentially characterized by rhythms of effort in the course of the work curve. The weights of this component resemble those of the fifth component in pattern *A*. In pattern *B*, this component plays a larger part than in *A*, chiefly because of its higher positive weight in the last test, code multiplication. It should be noted that when the subjects took code multiplication *B*, they knew that it was the last test they were to have in the entire series, their last opportunity to do well with that particular examiner. Thus the subject who is more susceptible to such influences would be more highly stimulated when taking the last *B* test than when taking the last *A* test. In the latter, although knowing that it was to be the last test in the immediate series, the subject realized that in two weeks' time other similar tests would be given.

The smallest and *fifth component* in the *B* pattern corresponds most closely to the factor of "written" versus "mental" solution described as the fourth component of pattern *A*. In pattern *B*, this factor is very small and not as important as in *A*. The interpolated instruction has, at least for those subjects who made use of the devices described, greatly diminished the element of "mental" solution in verbal reasoning and code multiplication, and in this respect has rendered them more similar to the other three tests.

C. IMPLICATIONS FOR MENTAL ORGANIZATION

From the comparison of the factor patterns presented in the preceding section, the conclusion seems

inevitable that a marked change in the organization of the variables occurred from the first to the second testing periods. It is immaterial for the purposes of the present study to ascertain whether this change was effected solely by the interpolated instruction or by such instruction plus the repetition of the tests in parallel forms. The distinction is, in fact, a rather artificial one, since the repetition of a test and any interpolated experience both have the effect of changing the nature of the test for the subjects and differ only in the degree of their effectiveness. All of the evidence examined does, however, suggest that the interpolated instruction played by far the major rôle in producing the observed changes. This is especially borne out by the analysis of individual correlations between non-instruction, instruction: non-instruction, and instruction tests given in Section *A*. That such a brief and condensed period of instruction could so radically alter the pattern of factors in five variables is indeed suggestive of what probably occurs in the course of everyday experiences. The changes observed from pattern *A* to pattern *B* include nearly every conceivable change that a factor pattern could undergo. The relative weights of the factors differed, the location of the factors in the several variables was altered, and new factors appeared which in the first pattern had either played a minor rôle or were so inextricably bound up with some other factor that they operated as one.

It might be argued that the same fundamental underlying factors are present in both factor patterns, but

that they are manifested differently. Since the nature of the tests changes, as must any stimulus on successive presentations whether or not the subject has had relevant intervening experiences, it might be suggested that the various factors operate differently in each of the tests. This would not, then, preclude the possibility that the factors themselves remain unchanged. Such an argument hinges largely upon the concept of the psychological counterpart of statistical factors. A factor is frequently regarded as a common ability or reaction tendency which enters into the subject's performance in a number of tasks, but which is itself independent of other abilities and unitary, i.e., it always operates as a unit. Such unit abilities or reaction tendencies of the individual might conceivably remain constant, although concrete performance on specific tests altered.

The difficulty presented by such an interpretation, however, is intrinsic in the methods of identifying factors. How can underlying independent unit abilities be discovered? It would seem that any psychological interpretation of factors must take into account the procedure whereby such factors are isolated. This procedure is based solely on the observed interrelations in the performance of subjects on a specific set of tests at a given time. Thus a factor is actually an observed tendency for the subject's responses to a group of tests to resemble each other more closely than his responses to other tests. If intervening experience has altered this tendency, then the factor itself is altered, as far as the data show. Any assumption that an underlying

factor has remained constant would be entirely conjectural—such a factor, furthermore, could never be investigated directly by any method.

The findings of the present study regarding the susceptibility of mental organization to even slight intervening experiences suggest two chief implications for the theory of mental organization. First, the various factor patterns which have been found on different populations may have been environmentally produced. In so far as the experiences of all of the groups employed in such studies have common features, certain fundamental similarities in mental organization have been reported. In so far, however, as these experiences have varied from group to group, different patterns of mental organization were found. Thus a very widespread "verbal factor" could easily result in our society in which language plays so important a part in a wide variety of fields. If, on the other hand, there were an educational system in which only woodcraft and poetry were taught, we might indeed find a "group factor" common to these two abilities and to no other; those subjects who had spent more time and effort on their academic work would excel in both, but not necessarily in other fields of activity. The specific findings of the present study are themselves an illustration of how "group factors" might be produced or obliterated by the subject's experience.

The second implication is essentially a corollary of the first. As the subject's experiences accumulate throughout his life, certain alterations in the pattern of mental organization will follow. The relationships of

performance in the same or similar situations will not remain constant over a long period of time. If the lapse of time is short, the influence of the intervening experience may be too slight to produce an appreciable difference in factor pattern; over a long period, however, the cumulative effect will become apparent, as in the comparison of children with adults, or children at widely varying age levels.

Both of the above points may be summed up in what may be termed a concept of *shifting mathematical components*. At any one time, the relationships among the individual's performances on a number of tests may be explained in terms of a small number of independent unitary components. These components, however, are only a mathematical summary or conceptual simplification of the observed relations among concrete tasks. Such relationships will shift from time to time in the same subjects, or from one population to another, because of varying experiences. Practically, the function of factor pattern analysis would then be twofold: (1) for purposes of prediction, to discover any relatively stable patterns within clearly defined populations, which may result from fundamental similarities in the experiences of subjects within such a population; (2) to investigate more directly the nature, extent, and *modus operandi* of influences which determine and alter relationships in performance.

V

SUMMARY

The literature on the rapidly developing field of mental organization was surveyed with respect to theories, methodology, and findings. The present-day *theories*, although exhibiting a more fundamental agreement than they did at their inception, still present major differences in emphasis and interpretation. All of the theories are, however, converging towards a universal acceptance of group factors of varying extent. An examination of the mathematical *methods* of treating the data of mental organization, from the original "hierarchical" test of Spearman to current techniques of factor pattern analysis, reveals the dependence of all methods upon certain initial assumptions or limiting conditions. In selecting a particular method for use, one should be cognizant of the limiting conditions imposed by that method and should take them into consideration in interpreting the final results. A comparison of the specific *findings* of studies on different populations reveals a lack of constancy in the obtained patterns of relationship. Chief among such differences is that between different age groups. Several investigators have reported a tendency for the "general" factor to decrease and for "group" factors to increase with age. This finding, together with other minor differences, suggests that mental organization may be altered or determined by environmental influences.

The essential problem of the present study was the experimental alteration of a factor pattern by a brief,

relevant, interpolated experience. Five tests, including vocabulary, digit span, pattern analysis, verbal reasoning, and code multiplication, were administered on two successive days to 200 sixth-grade school children of both sexes. The subjects were then given instruction in the use of special devices which would facilitate performance on the last three tests only. After a lapse of 13 days, parallel forms of all of the five tests were administered under exactly the same conditions as in the initial testing.

An analysis of the separate variables in the initial and final testing shows a reliable increase in mean score in all five tests, although the gain was much larger in the three "instruction" tests. The variability and the reliability coefficients of the tests did not, however, exhibit any marked or consistent change, and could not adequately account for any significant change in the relationships of the variables. A comparison of the intercorrelations among the five variables in the initial and final testing shows practically no change in the correlation between the two "non-instruction" tests, a slight change in the correlations between "instruction" and "non-instruction" tests, and a marked change in the correlations among the three "instruction" tests. Factor pattern analyses, found by Hotelling's method of principal components, show a wide variation from the initial to the final testing. A tentative identification of the factors isolated in the two patterns is offered, and the analysis is interpreted in terms of the specific influence of the interpolated instruction.

Two mutually related conclusions are suggested for

the theory of mental organization: (1) factor patterns may be experientially determined; (2) factor patterns will differ in the same subjects at different times, as well as from one population to another. "Factors" should be empirically defined in terms of the concrete relationships from which they are found, and should be regarded as "shifting mathematical components" rather than as fixed, underlying psychological entities.

REFERENCES

1. ABELSON, A. R. The measurement of mental ability of "backward" children. *Brit. J. Psychol.*, 1911, 4, 268-314.
2. ADAMS, H. F. The theory of two factors: an alternative explanation. Parts I, II, and III. *J. Appl. Psychol.*, 1931, 15, 16-34; 358-377.
3. ———. A non-intellectual general factor. *J. Educ. Psychol.*, 1932, 23, 173-178.
4. ———. The two-factor theory of ability: reply to Dr. R. H. Thouless and rejoinder. *J. Appl. Psychol.*, 1932, 16, 572-576.
5. ALEXANDER, W. P. Research in guidance. *Occup.*, 1934, 12, 75-91.
6. ———. Intelligence, concrete and abstract: a study in differential traits. *Brit. J. Psychol., Monog. Suppl.*, 1935, No. 19. Pp. 177.
7. ANASTASI, A. A group factor in immediate memory. *Arch. Psychol.*, 1930, No. 120. Pp. 61.
8. ———. Further studies on the memory factor. *Arch. Psychol.*, 1932, No. 142. Pp. 60.
9. ———. Some ambiguous concepts in the field of mental organization. *Amer. J. Psychol.*, 1935, 47, 508-511.
10. ASCH, S. E. The constancy of mental organization. *Psychol. Bull.*, 1935, 32, 718.
11. ASHER, E. J. The predictive value of mental tests that satisfy Spearman's tetrad criterion. *J. Appl. Psychol.*, 1929, 13, 152-158.
12. BAGG, H. J. Individual differences and family resemblances in animal behavior. A study of habit formation in various strains of mice. *Arch. Psychol.*, 1920, No. 43. Pp. 58.
13. BAILOR, E. M. Content and form in tests of general intelligence. *Teach. Coll. Contrib. Educ.*, 1924, No. 162. Pp. 74.
14. BARTLETT, M. S. The statistical estimation of *G*. *Brit. J. Psychol.*, 1935, 26, 199-206.
15. BERNSTEIN, E. Quickness and intelligence. *Brit. J. Psychol., Monog. Suppl.*, 1924, 3, No. 7. Pp. vi+55.

16. BLACK, T. P. Mental measurement. The probable error of some boundary conditions in diagnosing the presence of group and general factors. *Proc. Roy. Soc. Edinburgh*, 1928, 49, Part 1 (6), 72-77.
17. BONSER, F. G. The reasoning ability of children of the fourth, fifth and sixth school grades. *Teach. Coll. Contrib. Educ.*, 1910, No. 37. Pp. 133.
18. BRIGHAM, C. C. Validity of tests in examination of immigrants. *Indus. Psychol.*, 1926, 1, 413-417.
19. BROLYER, C. R. A formula for the mean tetrad. *J. Gen. Psychol.*, 1932, 6, 212-214.
20. BROWN, A. W. The unevenness of abilities in dull and bright children. *Teach. Coll. Contrib. Educ.*, 1926, No. 220. Pp. 112.
21. BROWN, W. Mathematical and experimental evidence for the existence of a central intellectual factor. *Nature*, 1932, 130, 588-589.
22. ———. The mathematical and experimental evidence for the existence of a central intellectual factor (*g*). *Brit. J. Psychol.*, 1932, 23, 171-179.
23. ———. A note on the theory of two factors *versus* the sampling theory of mental ability. *Brit. J. Psychol.*, 1935, 25, 395-398.
24. BROWN, W., & STEPHENSON, W. A test of the theory of two factors. *Brit. J. Psychol.*, 1933, 23, 352-370.
25. ———. Professor Godfrey Thomson's note. *Brit. J. Psychol.*, 1933, 24, 209-212.
26. BROWN, W., & THOMSON, G. H. The essentials of mental measurement. London: Cambridge Univ. Press, 1925. Pp. 224.
27. BRYAN, A. I. Organization of memory in young children. *Arch. Psychol.*, 1934, No. 162. Pp. 56.
28. BURT, C. L. Experimental tests of general intelligence. *Brit. J. Psychol.*, 1909, 3, 94-177.
29. ———. General and specific factors underlying the primary emotions. *Rep. Brit. Asso. Adv. Sci.*, 1915, 85, 694-696.
30. ———. The development of reasoning in school children. *J. Exper. Ped.*, 1919, 5, 68-77; 121-127.
31. CALFEE, M. College freshmen and four intelligence tests. *J. Educ. Psychol.*, 1913, 4, 223-231.

32. CAMP, B. H. The converse of Spearman's two-factor theorem. *Biometrika*, 1932, 24, 418-427.
33. CAREY, N. Factors in the mental processes of school children. Part I. *Brit. J. Psychol.*, 1914-15, 7, 453-490; Part II, *ibid.*, 1915-17, 8, 70-92.
34. CAROTHERS, F. E. Psychological examination of college students. *Arch. Psychol.*, 1921, No. 46. Pp. 82.
35. CARTER, H. D. The organization of mechanical intelligence. *J. Genet. Psychol.*, 1928, 35, 270-285.
36. ———. A reply to Prof. Spearman. *J. Educ. Psychol.*, 1930, 21, 627-628.
37. ———. A reply to some recent criticisms by Prof. Spearman. *J. Educ. Psychol.*, 1931, 22, 118-119.
38. CARTER, H. D., PYLES, M. K., & BRETNALL, E. P. A comparative study of factors in vocational interest of high school boys. *J. Educ. Psychol.*, 1935, 26, 81-98.
39. CHANT, S. N. F. Multiple factor analysis and psychological concepts. *J. Educ. Psychol.*, 1935, 26, 263-272.
40. COMMINS, W. D. A comparison of intelligence tests. *School & Soc.*, 1928, 27, 298-300.
41. COPELAND, H. A. A note on "the vectors of mind." *Psychol. Rev.*, 1935, 42, 216-218.
42. COX, J. W. Mechanical aptitude—its existence, nature, and measurement. London: Methuen, 1928. Pp. 209.
43. ———. A critical note on some recent research on mechanical ability. *J. Genet. Psychol.*, 1932, 41, 228-234.
44. ———. Manual skill—its organization and development. London: Cambridge Univ. Press, 1934. Pp. 247.
45. CURETON, E. E. Wishart's exact formula for the standard error of the product-moment tetrad versus an approximation formula. *J. Educ. Psychol.*, 1935, 26, 212-217.
46. CURETON, E. E., & DUNLAP, J. W. Some effects of heterogeneity on the theory of factors. *Amer. J. Psychol.*, 1930, 42, 608-620.
47. DARMOIS, G. Sur la théorie des deux facteurs de Spearman. *C. R. Acad. Sci.*, 1934, 199, 1177-1178; 1358-1363.
48. DAVBY, C. M. Comparison of group verbal and pictorial tests of intelligence. *Brit. J. Psychol.*, 1926, 17, 27-48.
49. DAVIS, E. A. Knox cube test and digit span. *J. Genet. Psychol.*, 1932, 40, 234-237.

50. DEARBORN, W. F. On biting versus barking criticism. *J. Educ. Psychol.*, 1930, 21, 545-546.
51. DeVoss, J. C. With Terman, L. M., *et al.* Specialization of the abilities of gifted children. Chap. 12 in *Genetic Studies of Genius*. Vol. I. Stanford University, Calif.: Stanford Univ. Press, 1925. Pp. 307-361.
52. DODD, S. C. The coefficient of equi-proportion as a criterion of hierarchy. *J. Educ. Psychol.*, 1928, 19, 217-229.
53. ———. The theory of factors. Parts I and II. *Psychol. Rev.*, 1928, 35, 211-234; 261-279.
54. ———. On the sampling theory of intelligence. *Brit. J. Psychol.*, 1929, 19, 306-327.
55. DU BOIS, P. H. A speed factor in mental tests. *Arch. Psychol.*, 1932, No. 141. Pp. 38.
56. DUNLAP, J. W. The organization of learning and other traits in chickens. *Comp. Psychol. Monog.*, 1933, No. 9. Pp. 55.
57. DUNLAP, J. W., & CURETON, E. E. On the analysis of causation. *J. Educ. Psychol.*, 1930, 21, 657-680.
58. DWELSHAUVERS, G. Le sens du concret et l'intelligence globale (ou facteur G). *Psychol. et la vie*, 1928, 2, 187-190.
59. EARLE, F. M., MACRAE, A., *et al.* Tests of mechanical ability. *Nat. Instit. Psychol. Rep.*, 1929, No. 3. Pp. 42.
60. EARLE, F. M., & MILNER, M. The use of performance tests in vocational guidance. (*Indus. Fatigue Res. Board Rep.*, No. 53.) London: H. M. Stationery Office, 1929. Pp. v+76.
61. EDDS, J. H. The measurement of verbal and non-verbal abilities. *Peabody Coll. Contrib. Educ.*, 1930, No. 75. Pp. 34.
62. ———. The nature of verbal and non-verbal abilities. *J. Exper. Educ.*, 1935, 3, 225-229.
63. EDGERTON, H. A., & VALENTINE, W. L. A factor analysis of learning data. *Psychol. Bull.*, 1935, 32, 719-720.
64. EMMETT, W. G. The tetrad criterion and scholastic examinations. *Brit. J. Psychol.*, 1935, 5, 93-100.
65. FARMER, E. A group factor in sensory motor tests. *Brit. J. Psychol.*, 1927, 17, 327-334.

66. FINDLEY, W. G. Specialization of verbal facility at the college entrance level. *Teach. Coll. Contrib. Educ.*, 1933, No. 567. Pp. 76.
67. ———. A multiple factor method yielding only positive weights. *Psychol. Bull.*, 1934, 31, 676-677.
68. FISCHLER, D., & ULLERT, I. Contribution à l'étude des tests de mémoire immédiate. *Arch. de psychol.*, 1929, 21, 293-306.
69. FLANAGAN, J. C. Factor analysis in the study of personality. Stanford University, Calif.: Stanford Univ. Press, 1935. Pp. 103.
70. FLÜGEL, J. C. Practice, fatigue, and oscillation. *Brit. J. Psychol., Monog. Suppl.*, 1928, 4, No. 13. Pp. 92.
71. FORAN, T. G., LILLIS, G. A., & O'LEARY, C. E. A study of trait variability. *Cath. Univ. Amer., Educ. Res. Bull.*, 1928, 3, No. 6.
72. FOURACRE, L. Psychological tests of mathematical ability. *Forum Educ.*, 1926, 3, 201-205.
73. GARNETT, J. C. M. On certain independent factors in mental measurements. *Proc. Roy. Soc. London*, 1919, 96A, 91-111.
74. ———. General ability, cleverness, and purpose. *Brit. J. Psychol.*, 1919, 9, 345-366.
75. ———. Review of "the essentials of mental measurement," by William Brown and Godfrey H. Thomson. *Brain*, 1921, 44, 332-337.
76. ———. Further notes on the single general factor in mental measurements. *Brit. J. Psychol.*, 1932, 22, 364-372.
77. ———. The single general factor; a note on linear transformations of hierarchal systems. *Brit. J. Psychol.*, 1934, 25, 100-105.
78. GARNETT, J. C. M., & THOMSON, G. H. A joint note on "the hierarchy of abilities." *Brit. J. Psychol.*, 1919, 9, 367-368.
79. GARRETT, H. E. The relation of tests of memory and learning to each other and to general intelligence in a highly selected adult group. *J. Educ. Psychol.*, 1928, 19, 601-613.
80. ———. A study of the C A V D Intelligence Examination. *J. Educ. Res.*, 1930, 21, 103-108.

81. ———. The sampling distribution of the tetrad equation. *J. Educ. Psychol.*, 1933, 24, 536-542.
82. ———. The two-factor theory and its criticisms. *Psychol. Rev.*, 1935, 42, 293-301.
83. GARRETT, H. E., & ANASTASI, A. The tetrad-difference criterion and the measurement of mental traits. *Ann. N. Y. Acad. Sci.*, 1932, 33, 234-281.
84. GARRETT, H. E., BRYAN, A. I., & PERL, R. E. The age factor in mental organization. *Arch. Psychol.*, 1935, No. 176. Pp. 31.
85. GERMAIN, J., & RODRIGO, M. Primeros resultados de un test de inteligencia general. *Arch. de neurobiol.*, 1933, 13, 1189-1221.
86. HARDIE, J. L. Spearman's measure of intelligence: a statistical analysis. *Brit. J. Psychol.*, 1928, 19, 188-197.
87. HART, B., & SPEARMAN, C. General ability, its existence and nature. *Brit. J. Psychol.*, 1912, 5, 51-84.
88. HEYMANS, G., & BRUGMANS, H. J. T. W. Intelligenzprüfungen mit Studieren. *Zsch. f. Psychol.*, 1913, 7, 317-331.
89. HEYWOOD, H. B. The general factor in Spearman's theory of intelligence. *Nature*, 1931, 127, 306-307.
90. HOLZINGER, K. J. On tetrad differences with overlapping variables. *J. Educ. Psychol.*, 1929, 20, 91-97.
91. ———. Statistical résumé of the Spearman two-factor theory. Chicago: Univ. Chicago Press, 1930. Pp. 43.
92. ———. Thorndike's C A V D is full of G. *J. Educ. Psychol.*, 1931, 22, 161-166.
93. ———. Reply to Professor Kelley. *J. Educ. Psychol.*, 1931, 22, 455-457.
94. HOLZINGER, K. J., & SWINEFORD, F. Uniqueness of factor patterns. *J. Educ. Psychol.*, 1932, 23, 247-258.
95. ———. Selected references on statistics and the theory of test construction. *School Rev.*, 1933, 41, 462-466; 1934, 42, 459-465.
96. HOTELLING, H. Analysis of a complex of statistical variables into principal components. *J. Educ. Psychol.*, 1933, 24, 417-441; 498-520.
97. ———. The most predictable criterion. *J. Educ. Psychol.*, 1935, 26, 139-142.

98. HULL, C. L. Aptitude testing. Yonkers, N. Y.: World Book Co., 1928. Pp. xiv+535.
99. IRWIN, J. O. On the uniqueness of the factor *g* for general intelligence. *Brit. J. Psychol.*, 1932, 22, 359-363.
100. ———. A critical discussion of the single-factor theory. *Brit. J. Psychol.*, 1933, 23, 371-381.
101. ———. On the indeterminacy in the estimate of *g*. *Brit. J. Psychol.*, 1935, 25, 393-394.
102. JONES, E. S. The influence of age and experience on correlations concerned with mental tests. *Educ. Psychol. Monog.*, 1917, No. 22. Pp. 89.
103. JONES, L. W. Present day theories of intellectual factors (general, group, and specific). *Brit. J. Psychol.*, 1933, 3, 1-12.
104. JORGENSEN, C. Analysis of some psychological tests by the Spearman factor method. *Brit. J. Educ. Psychol.*, 1934, 4, 96-108.
105. KELLEY, T. L. Crossroads in the mind of man; a study of differentiable mental abilities. Stanford University, Calif.: Stanford Univ. Press, 1928. Pp. 238.
106. ———. What is meant by a *G* factor? *J. Educ. Psychol.*, 1931, 22, 364-366.
107. ———. The analysis of a complex of mental measurements into components. *Psychol. Bull.*, 1935, 32, 718-719.
108. ———. Essential traits of mental life. Cambridge: Harvard Univ. Press, 1935. Pp. 145.
109. KRUEGER, F., & SPEARMAN, C. Die Korrelation zwischen verschiedenen geistigen Leistungsfähigkeiten. *Zsch. f. Psychol.*, 1906, 44, 50-114.
110. LAMMERMAN, H. Über das Verhältnis von Allgemein- und Sonderbegabung und seine Bedeutung für eine organisatorische Differenzierung der Schule. *Zsch. f. päd. Psychol.*, 1931, 32, 377-391.
111. LANKES, W. Perseveration. *Brit. J. Psychol.*, 1915, 7, 387-419.
112. LINE, W. Die Lehre der "Noegenesis." *Arch. f. d. ges. Psychol.*, 1929, 68, 241-267.
113. LINE, W., & HEDMAN, H. B. A simplified statement of the two-factor theory. *J. Educ. Psychol.*, 1933, 24, 195-220.
114. ———. The reversibility of proof. *J. Exper. Educ.*, 1935, 3, 216-224.

115. LINE, W., & KAPLAN, E. The existence, measurement, and significance of a speed factor in the abilities of public school children. *J. Exper. Educ.*, 1932, 1, 1-8.
116. LINE, W., ROGERS, K. H., & KAPLAN, E. Factor-analysis techniques applied to public school problems. *J. Educ. Psychol.*, 1934, 25, 58-65.
117. MACFARLANE, M. A study of practical ability. *Brit. J. Psychol., Monog. Suppl.*, 1925, No. 8. Pp. 75.
118. MACKIE, J. The probable value of the tetrad difference on the sampling theory. *Brit. J. Psychol.*, 1928, 19, 65-76.
119. ———. The sampling theory as a variant of the two-factor theory. *J. Educ. Psychol.*, 1928, 19, 614-621.
120. ———. Mathematical consequences of certain theories of mental ability. *Proc. Roy. Soc. Edinburgh*, 1929, 49, 16-37.
121. MARSHALL, A. J. The standardization of Spearman's "measure of intelligence" for Perth, Western Australia. *Aust. Council Educ. Res. Ser.*, 1934, No. 22, 23-50.
122. McCULLOCH, T. L. A study of the cognitive abilities of the white rat with special reference to Spearman's theory of two factors. *Duke Univ. Contrib. Psychol. Theory*, 1935, No. 2. Pp. 66.
123. McDONOUGH, M. R. General factor in a table of inter-correlations. *Science*, 1929, 69, 402.
124. McDougall, W. On the nature of Spearman's general factor. *Char. & Person.*, 1935, 3, 127-143.
125. MEILI, R. Recherches sur les formes d'intelligence. *Arch. de psychol.*, 1930, 22, 201-284.
126. ———. A propos de la théorie des facteurs. Réponses à M. C. Spearman. *Arch. de psychol.*, 1930, 22, 328-332.
127. MERRILL, M. A. On the relation of intelligence to achievement in the case of mentally retarded children. *Comp. Psychol. Monog.*, 1924, No. 2. Pp. 100.
128. MONNIN, J. Recherches sur l'intelligence. Données sur la parenté de certaines formes d'intelligence. *Bull. Instit. Nat. d'orient. Prof.*, 1933, 5, 1-8.
129. MONROE, W. S., & STURT, D. B. Correlation analysis as a means of studying contributions of causes. *J. Exper. Educ.*, 1935, 3, 155-165.
130. MOORE, T. V. Multiple correlation and the correlation between general factors. *Cath. Univ. Amer., Stud. Psychol. & Psychiat.*, 1931, No. 1. Pp. 32.

131. National Research Council: Conference on Individual Differences in Special and General Abilities. Issued by N. R. C., Washington, D. C., 1931.
132. N. Y. COLLEGE ENTRANCE EXAMINATION BOARD. Reports of the Commission on Scholastic Aptitude Tests, 1926-1935.
133. NYGAARD, P. H. Interpretation of correlation on the basis of common elements. *J. Educ. Psychol.*, 1932, 23, 578-585.
134. OATES, D. W. A statistical and psychological investigation of intelligence tests. *Forum Educ.*, 1928, 6, 38-62.
135. ———. Group factors in temperament qualities. *Brit. J. Psychol.*, 1929, 20, 118-136.
136. OTIS, A. S. An absolute point scale for the group measurements of intelligence. *J. Educ. Psychol.*, 1918, 9, 239-261.
137. PALLISTER, H. The negative or withdrawal attitude: a study in personality organization. *Arch. Psychol.*, 1933, No. 151. Pp. 56.
138. PATERSON, D. G., *et al.* Minnesota mechanical ability tests. Minneapolis: Univ. Minn. Press, 1930. Pp. 586.
139. PEARSON, K., & MOUL, M. The mathematics of intelligence. I: The sampling errors in the theory of a generalized factor. *Biometrika*, 1927, 19, 246-291.
140. PEATMAN, J. G. A study of factors measured by the Thorndike Intelligence Examination for High School Graduates. *Arch. Psychol.*, 1931, No. 128. Pp. 56.
141. PERL, R. E. An application of Thurstone's method of factor analysis to practice series. *Psychol. Bull.*, 1934, 31, 631.
142. PERRY, R. C. A group factor analysis of the adjustment questionnaire. *So. Calif. Educ. Monog.*, 1934, No. 5. Pp. 93.
143. PIAGGIO, H. T. H. The general factor in Spearman's theory of intelligence. *Nature*, 1931, 127, 56-57.
144. ———. Three sets of conditions necessary for the existence of a g that is real and unique except in sign. *Brit. J. Psychol.*, 1933, 24, 88-105.
145. ———. Approximate general and specific factors without indeterminate parts. *Brit. J. Psychol.*, 1935, 25, 485-489.

146. PIAGGIO, H. T. H., & DALLAS, A. E. M. M. An analysis of recent tests of the two-factor theory. *Brit. J. Psychol.*, 1934, 25, 217-220.
147. PIOTROWSKI, Z. A. L. A mathematical criterion of intelligence. *Kvar. psycholog.*, 1934, 5, 383-393.
148. PRESSEY, S. L. Irregularity on a Binet examination as a measure of its reliability. *Psychol. Clin.*, 1918-19, 12, 236-240.
149. REINHART, M. A scale for measuring the *g*-factors in intelligence. *Cath. Univ. Amer., Stud. Psychol. & Psychiat.*, 1931, 2, 1-42.
150. ROGERS, A. L. Experimental tests of mathematical ability and their prognostic value. *Teach. Coll. Contrib. Educ.*, 1918, No. 89. Pp. 118.
151. ROGERS, K. H. "Intelligence" and "perseveration" related to school achievement. *J. Exper. Educ.*, 1933, 2, 35-43.
152. RUSSELL, O. R. Some observations on multiple factor analysis. *J. Educ. Psychol.*, 1935, 26, 284-290.
153. SCHÄFER, R. C. Spearman's theoretisch-psychologisches werk "The Nature of Intelligence and the Principles of Cognition" in kritischer Beleuchtung. *Arch. ges. Psychol.*, 1934, 92, 289-314.
154. SCHILLER, B. Verbal, numerical, and spatial abilities of young children. *Arch. Psychol.*, 1934, No. 161. Pp. 69.
155. SCHNECK, M. M. R. The measurement of verbal and numerical abilities. *Arch. Psychol.*, 1929, No. 107. Pp. 49.
156. SIMPSON, B. R. Correlations of mental abilities. *Teach. Coll. Contrib. Educ.*, 1912, No. 53. Pp. 122.
157. SLOCOMBE, C. S. The constancy of *g*, general intelligence. *Brit. J. Psychol.*, 1926, 17, 93-110.
158. ———. The measurement of intelligence. *J. Educ. Psychol.*, 1926, 17, 600-607.
159. ———. Of mental testing—a pragmatic theory. *J. Educ. Psychol.*, 1928, 19, 1-24.
160. ———. Truman L. Kelley measures mental traits. *J. Educ. Psychol.*, 1928, 19, 497-501.
161. SMITH, C. E. The construction and validation of a group test of intelligence using the Spearman technique. *Bull. Dept. Educ. Res., Ontario Coll. Educ.*, 1935, No. 5. Pp. 55.

162. SMITH, G. M. Group factors in mental tests similar in form or in content. *Psychol. Bull.*, 1933, 30, 568-569.
163. ———. Group factors in mental tests similar in material or in structure. *Arch. Psychol.*, 1933, No. 156. Pp. 56.
164. ———. An analysis of verbal and numerical abilities by the Hotelling and the simplified Thurstone methods with an empirical evaluation of the methods. *Psychol. Bull.*, 1934, 31, 631-632.
165. SPEARMAN, C. "General intelligence" objectively determined and measured. *Amer. J. Psychol.*, 1904, 15, 201-293.
166. ———. The theory of two factors. *Psychol. Rev.*, 1914, 21, 101-115.
167. ———. Manifold sub-theories of "the two factors." *Psychol. Rev.*, 1920, 27, 159-172.
168. ———. Recent contributions to the theory of "two factors." *Brit. J. Psychol.*, 1922, 13, 26-30.
169. ———. Correlation between arrays in a table of correlations. *Proc. Roy. Soc. London*, 1922, 101A, 94-100.
170. ———. Further note on the "theory of two factors." *Brit. J. Psychol.*, 1923, 13, 266-270.
171. ———. Agreement on cooperation. *J. Educ. Psychol.*, 1925, 16, 423-425.
172. ———. Some issues in the theory of "G." *Rep. Brit. Asso. Adv. Sci.*, 1925, 59, 174-181.
173. ———. Material *versus* abstract factors in correlation. *Brit. J. Psychol.*, 1927, 17, 322-326.
174. ———. Critical notice of "the measurement of intelligence" by Professor E. L. Thorndike and Staff. *Brit. J. Psychol.*, 1927, 17, 365-369.
175. ———. The abilities of man. New York: Macmillan, 1927. Pp. 415.
176. ———. The sub-structure of the mind. *Brit. J. Psychol.*, 1928, 18, 249-261.
177. ———. Pearson's contribution to the theory of two factors. *Brit. J. Psychol.*, 1928, 19, 95-101.
178. ———. "The abilities of man." *Science*, 1928, 68, 38.
179. ———. The uniqueness of "G." *J. Educ. Psychol.*, 1929, 20, 212-216.

180. ———. Response to T. Kelley. *J. Educ. Psychol.*, 1929, 20, 561-568.
181. ———. "G" and after—a school to end schools. In *Psychologies of 1930*, ed. by C. Murchison. Worcester, Mass.: Clark Univ. Press, 1930. Pp. 339-366.
182. ———. A truce to "barking in." *J. Educ. Psychol.*, 1930, 21, 110-111.
183. ———. Disturbers of tetrad differences. Scales. *J. Educ. Psychol.*, 1930, 21, 559-573.
184. ———. Heterogeneity and the theory of factors. *Amer. J. Psychol.*, 1930, 42, 645-646.
185. ———. La théorie des facteurs. *Arch. de psychol.*, 1930, 22, 313-327.
186. ———. The theory of "two factors" and that of "sampling." *Brit. J. Educ. Psychol.*, 1931, 1, 140-161.
187. ———. What the theory of factors is *not*. *J. Educ. Psychol.*, 1931, 22, 112-117.
188. ———. Our need of some science in place of the word "intelligence." *J. Educ. Psychol.*, 1931, 22, 401-410.
189. ———. Pitfalls in the use of "probable errors." *J. Educ. Psychol.*, 1932, 23, 481-488.
190. ———. The uniqueness and exactness of *g*. *Brit. J. Psychol.*, 1933, 24, 106-108.
191. ———. The factor theory and its troubles: II. Garbling the evidence. *J. Educ. Psychol.*, 1933, 24, 521-524. III. Misrepresentation of the theory. *Ibid.*, 1933, 24, 591-601. IV. Uniqueness of *G*. *Ibid.*, 1934, 25, 142-153. V. Adequacy of proof. *Ibid.*, 1934, 25, 310-319. Conclusion: Scientific value. *Ibid.*, 1934, 25, 383-391.
192. ———. Discussion: Professor Tryon on factors. *Psychol. Rev.*, 1934, 41, 306-307.
193. ———. Analysis of abilities into factors by the method of least squares. *Brit. J. Educ. Psychol.*, 1934, 4, 183-185.
194. SPEARMAN, C., & HOLZINGER, K. The sampling error in the theory of two factors. *Brit. J. Psychol.*, 1924, 15, 17-19.
195. ———. Note on the sampling error of tetrad differences. *Brit. J. Psychol.*, 1925, 16, 86-88.
196. SPEARMAN, C., & THORNDIKE, E. L. A communication and a reply. *J. Educ. Psychol.*, 1924, 15, 393-395.
197. STEAD, H. G. Factors in mental and scholastic ability. *Brit. J. Psychol.*, 1926, 16, 199-221.

198. STEPHENSON, W. Tetrad-differences for non-verbal subtests. *J. Educ. Psychol.*, 1931, 22, 167-185.
199. ———. Tetrad-differences for verbal subtests. *J. Educ. Psychol.*, 1931, 22, 255-267.
200. ———. Tetrad-differences for verbal subtests relative to non-verbal subtests. *J. Educ. Psychol.*, 1931, 22, 334-350.
201. ———. Factorizing the reliability coefficient. *Brit. J. Psychol.*, 1934, 25, 211-215.
202. ———. An introduction to so-called motor perseveration tests. *Brit. J. Educ. Psychol.*, 1934, 4, 186-208.
203. ———. A note on factors and the partial correlation procedure. *Brit. J. Psychol.*, 1935, 25, 399-401.
204. ———. On Thomson's theorem for measuring g by overlapping tests. *Brit. J. Psychol.*, 1935, 25, 490-494.
205. ———. A note on the "purification" technique in two-factor analysis. *Brit. J. Psychol.*, 1935, 26, 196-198.
206. STEPHENSON, W., MACKENZIE, M., SIMMONS, C. A., KAPP, D. M., STUDMAN, G. L., & HUBERT, W. H. DE B. Spearman factors and psychiatry. *Brit. J. Med. Psychol.*, 1934, 14, 101-135.
207. SUTHERLAND, J. D. The speed factor in intelligent reactions. *Brit. J. Psychol.*, 1934, 24, 276-294.
208. ———. A reply to Dr. Stephenson's note on factors and the partial correlation procedure. *Brit. J. Psychol.*, 1935, 25, 402-403.
209. THOMPSON, C. O. Further evidence favoring the two-factor theory. *J. Educ. Res.*, 1930, 22, 95-102.
210. THOMPSON, J. R. Boundary conditions for correlation coefficients between three and four variables. *Brit. J. Psychol.*, 1928, 19, 77-94.
211. THOMSON, G. H. A hierarchy without a general factor. *Brit. J. Psychol.*, 1916, 8, 271-281.
212. ———. On the degree of perfection of hierarchal order among correlation coefficients. *Biometrika*, 1919, 12, 335-366.
213. ———. On the cause of hierarchal order among the correlation coefficients of a number of variates taken in pairs. *Proc. Roy. Soc. London*, 1919, 95, 400-408.
214. ———. The proof or disproof of the existence of general ability. *Brit. J. Psychol.*, 1919, 9, 323-336.

215. ———. The hierarchy of abilities. *Brit. J. Psychol.*, 1919, 9, 337-344.
216. ———. The general factor fallacy in psychology. *Brit. J. Psychol.*, 1920, 10, 319-326.
217. ———. General versus group factors in mental activities. *Psychol. Rev.*, 1920, 27, 173-190.
218. ———. The tetrad-difference criterion. *Brit. J. Psychol.*, 1927, 17, 235-255.
219. ———. A worked out example of the possible linkages of four correlated variables on the sampling theory. *Brit. J. Psychol.*, 1927, 18, 68-76.
220. ———. On the formation of structure diagrams between four correlated variables. *J. Educ. Psychol.*, 1927, 18, 145-158.
221. ———. Note on Dr. William Brown's paper on a central intellective factor. *Brit. J. Psychol.*, 1933, 23, 404.
222. ———. Hotelling's method modified to give Spearman's "*g*." *J. Educ. Psychol.*, 1934, 25, 366-374.
223. ———. The orthogonal matrix transforming Spearman's two-factor equations into Thomson's sampling equations in the theory of ability. *Nature*, 1934, 134, 700.
224. ———. The meaning of "*v*" in the estimate of "*g*." *Brit. J. Psychol.*, 1934, 25, 92-99.
225. ———. On measuring *g* and *s* by tests which break the *g* hierarchy. *Brit. J. Psychol.*, 1934, 25, 204-210.
226. ———. Group factors in school subjects. *Brit. J. Educ. Psychol.*, 1935, 5, 194-198.
227. ———. On complete families of correlation coefficients, and their tendency to zero tetrad-differences: including a statement of the sampling theory of abilities. *Brit. J. Psychol.*, 1935, 26, 63-92.
228. ———. The definition and measurement of "*g*" (general intelligence). *J. Educ. Psychol.*, 1935, 26, 241-262.
229. ———. The factorial analysis of human abilities. *Human Factor*, 1935, 9, 180-185; cf. also reply by R. H. Thouless and rejoinder by G. H. Thomson, *ibid.*, 358-363.
230. THORNDIKE, E. L. Educational psychology. Vol. III: Mental work and fatigue and individual differences and their causes. New York: Teach. Coll., Columbia Univ., 1914. Pp. x+408.

231. ———. Intelligence and its uses. *Harper's Mag.*, 1920, 140, 227-235.
232. ———. On the organization of intellect. *Psychol. Rev.*, 1921, 28, 141-151.
233. ———. Intelligence and its measurement: a symposium. *J. Educ. Psychol.*, 1921, 12, 124-127.
234. ———. Unity or purity in traits and tests. *Occup.*, 1934, 12, 57-59.
235. ———. The organization of mind. *Rep. 43rd Annual Meeting, Amer. Psychol. Asso.*, 1935. Pp. 61-62.
236. THORNDIKE, E. L., *et al.* The measurement of intelligence. New York: Bur. Publ., Teach. Coll., Columbia Univ., 1926. Pp. xxvi+616.
237. THORNDIKE, E. L., LAY, W., & DEAN, P. R. The relation of accuracy in sensory discrimination to general intelligence. *Amer. J. Psychol.*, 1909, 20, 364-369.
238. THORNDIKE, R. L. Organization of behavior in the albino rat. *Genet. Psychol. Monog.*, 1935, 17. Pp. 70.
239. THOULESS, R. H. Professor H. F. Adams and the two-factor theory of ability. *J. Appl. Psychol.*, 1932, 16, 374-381.
240. THUMB, N. Der Faktoren Aufbau einer Testreihe. *Zsch. f. angew. Psychol.*, 1933, 45, 86-130.
241. THURSTONE, L. L. Multiple factor analysis. *Psychol. Rev.*, 1931, 38, 406-427.
242. ———. A multiple factor study of vocational interests. *Person. J.*, 1931, 10, 198-205.
243. ———. The theory of multiple factors. Chicago: Author, 1933. Pp. 65.
244. ———. A simplified factor method and an outline of the computations. Chicago: Author, 1933. Pp. 25.
245. ———. The vectors of mind. *Psychol. Rev.*, 1934, 41, 1-32.
246. ———. Unitary abilities. *J. Gen. Psychol.*, 1934, 11, 126-130.
247. ———. A vocational interest schedule. *Psychol. Bull.*, 1935, 32, 719.
248. ———. Vectors of mind. Multiple-factor analysis for the isolation of primary traits. Chicago: Univ. Chicago Press, 1935. Pp. 266.

249. TRYON, C., & JONES, H. E. The relationship between "speed" and "altitude." *J. Exper. Psychol.*, 1933, 16, 98-114.
250. TRYON, R. C. Multiple factors versus two factors as determiners of abilities. *Psychol. Rev.*, 1932, 39, 324-351.
251. ———. So-called group factors as determiners of abilities. *Psychol. Rev.*, 1932, 39, 403-439.
252. ———. "The factor theory and its troubles"—misrepresentation of a criticism of the theory. *J. Educ. Psychol.*, 1934, 25, 232-233.
253. ———. Discussion: Interpretation of Professor Spearman's comments. *Psychol. Rev.*, 1935, 42, 122-125.
254. ———. A theory of *psychological* components—an alternative to 'mathematical factors.' *Psychol. Rev.*, 1935, 42, 425-454.
255. TURNER, A. H. The concept of validity in mental and achievement testing. *J. Educ. Psychol.*, 1934, 25, 81-95.
256. WALLIN, J. E. W. Intelligence irregularity as measured by scattering on the Binet scale. *J. Educ. Psychol.*, 1922, 13, 140-151.
257. WALTERS, E. H., & THOMAS, F. C. Some notes on the standardization of Professor Spearman's "measure of 'intelligence' for use in schools." *Forum Educ.*, 1929, 7, 35-42.
258. WASHBURN, M. F. Energy, engines, and the engineer. A critique of C. Spearman. *Amer. J. Psychol.*, 1929, 41, 322-326.
259. WEBB, E. Character and intelligence. *Brit. J. Psychol., Monog. Suppl.*, 1915, No. 3. Pp. 99.
260. WILSON, E. B. "The abilities of man, their nature and measurement." *Science*, 1928, 67, 244-248.
261. ———. On hierarchal correlation systems. *Proc. Nat. Acad. Sci.*, 1928, 14, 283-291.
262. ———. Comment on Prof. Spearman's note. *J. Educ. Psychol.*, 1929, 20, 217-223.
263. ———. On the invariance of general intelligence. *Proc. Nat. Acad. Sci.*, 1933, 19, 768-772.
264. ———. Transformations preserving the tetrad equations. *Proc. Nat. Acad. Sci.*, 1933, 19, 882-884.
265. ———. On overlap. *Proc. Nat. Acad. Sci.*, 1933, 19, 1039-1044.

266. ———. On resolution into generals and specifics. *Proc. Nat. Acad. Sci.*, 1934, 20, 193-196.
267. WILSON, E. B., & WORCESTER, J. The resolution of four tests. *Proc. Nat. Acad. Sci.*, 1934, 20, 189-192.
268. WILSON, J. H. The nature of intelligence. *J. Educ. Psychol.*, 1931, 22, 20-34.
269. ———. Group factors among abilities involved in a school certificate examination. Parts I and II. *Brit. J. Educ. Psychol.*, 1933, 3, 71-86; 99-108.
270. ———. The tetrad criterion and scholastic examinations. *Brit. J. Educ. Psychol.*, 1935, 5, 101-105.
271. ———. The exactness of "g" as determined by certain intelligence tests. *Brit. J. Psychol.*, 1935, 26, 93-98.
272. WISHART, J. Sampling errors in the theory of two factors. *Brit. J. Psychol.*, 1928, 19, 180-187.
273. ———. The two-factor theory of intelligence. *Nature*, 1933, 132, 677.
274. WISSELER, C. The correlation of mental and physical tests. *Psychol. Monog.*, 1901, No. 16. Pp. 62.
275. WYATT, S. The quantitative investigation of higher mental processes. *Brit. J. Psychol.*, 1913, 6, 109-133.
276. YULE, G. U. Critical note on "the essentials of mental measurement." *Brit. J. Psychol.*, 1921, 12, 100-107.
277. ZAPAN, G. Beziehungen zwischen den Unterrichts fächern in den höheren Schulen und Folgerung für die Schulorganisation. *Psychotechn. Zsch.*, 1933, 8, 102-111.

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STUDIES IN AGGRESSIVENESS*†

*From Bellevue Hospital, Psychiatric Division, and the Medical
College of New York University, Department of Psychiatry*

By

LAURETTA BENDER, SYLVAN KEISER, AND
PAUL SCHILDER

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I

A STUDY IN CRIMINAL AGGRESSIVENESS

SYLVAN KEISER AND PAUL SCHILDER

In the Court of General Sessions in the City of New York in 1934, there were 476 charges of assault (including 70 of rape and 14 of sodomy), 25 of armed robbery, and 75 of murder. This, out of a total of 2982 cases, is 18.1 per cent. All persons indicted for felonies in the Borough of Manhattan are tried in this Court. Thus crimes in which human beings are attacked in their bodily integrity are frequent. Despite the importance of physical aggressiveness, no particular studies on the subject have been published.

This is a study of criminal aggressiveness in patients committed to the Bellevue Psychiatric Hospital for observation, either before or after conviction for crime. We are here interested in aggressiveness in so far as it is concerned with physical damage to the body of the other person. The greatest expression of aggressiveness is in murder, but, whenever a wound is inflicted, the unity of the body of the person is disrupted. This is true even though no wound is inflicted but only pain is felt, since pain, too, disrupts the psychological unity of humans. We have the right to talk of physical aggressiveness when the possibility of movement is lessened, when there is restraint by force, or, further, when the physical damage is but threatened and not actual.

Aggressiveness is to be considered here as a general characteristic of human beings. Freud considers aggressiveness as a tendency to destruction and the ego-

instincts as only destructive ones. In his opinion they are at first self-destructive but are later turned against other persons and the outward world. We will not enter into a detailed criticism, but we do not think that the identification of the death instincts, the ego instincts, and the destructive tendencies is justified.

The studies of Melanie Klein (5) in children have shown this fact at least—that we have considerably underrated until now the amount of aggressiveness in children. The studies of Bender and Schilder (4), and Schilder and Wechsler (7) show an enormous number of destructive and aggressive tendencies in children. Children who are more than three or four years of age do not profess their aggressiveness freely; they believe, or merely make believe, that they defend themselves against the aggressiveness of others. These studies also show the close relationship which exists between aggressiveness and motility. An increase in motor impulses almost immediately results in an increase of destructive activity. Children hit and attack much more easily than adults. Thus the restriction of aggressiveness is one of the important tasks of education.

Alfred Adler (1) has always put emphasis on aggressive tendencies. Adler also speaks of a tendency to aggression which is particularly used for overcompensation of feelings of inferiority and insecurity, and for a masculine protest. Although these authors are interested in the general problem of aggressiveness, we are primarily interested in physical aggressiveness.

According to the trend of modern psychology, we

assume that physical aggressiveness antecedes mental aggressiveness, and, although physical aggressiveness has the same roots as psychic aggressiveness, it is not merely the strength of the impulse that causes it to remain physical.

Neither the analytical literature nor that of individual psychology has given more than casual attention to criminal aggressiveness. Alexander and Staub (3) hardly refer to it, and T. Reik (6, 7) in his two books, "Der unbekannte Mörder" and "Geständniszwang und Strafbedürfnis," does not give any specific interest to the problem. Franz Alexander (2) states that he and Healy found that in criminal behavior the tendency to exhibit masculinity is of great importance. He speaks of exhibitionistic heroism and believes that tyrannical public opinion helps provoke a reaction in the individual. He discusses the conflict between passive-feminine oral receptive tendencies and masculinity. We deemed it necessary to study a great deal of material in order to arrive at definite conclusions.

Our method was twofold. We studied our cases individually and as carefully as possible in the limited time observation allowed. We also prepared a questionnaire after we had gained partial insight into the problem. Before going into a detailed discussion, abstracts of some cases will first be presented. A case of alcoholic hallucinosis will first be discussed because it shows in an outspoken manner some features which are found in many cases.

H.K., white male, age 34, admitted to Bellevue Psychiatric Hospital on October 24, 1934, charged with

robbery. The cause for his transfer from the Tombs (City Prison) was self-inflicted lacerations of both wrists. Upon admission he had auditory hallucinations.

The crime in this case consisted of a holdup of two stores by the patient, who pretended to have a gun by keeping his hand in his coat pocket. There was no need for money, but he had hoped to be shot down by a policeman during the course of the crime. He had been drinking heavily for several days prior to the commission of the offense. The depression was due to his failure to find his wife, from whom he had been separated for two years. There had been several previous arrests for disorderly conduct while intoxicated.

Physical examination was essentially negative except for some mild features of chronic alcoholism. He was 6 feet, 4 inches tall and had feminine mannerisms.

His parents were successful mid-western stock. One brother, four years his junior, who had been divorced after four years of marital life, had the same birth date. The father dominated the home.

The patient was a high school graduate. He made no friends in elementary school; he was considered a "sissy" by most of the boys. In high school a few friendships were formed with football teammates. His participation in sports was only at the insistence of others.

There is a history of his having been a successful cattle salesman in early years under his father. Later he became a real estate salesman in the East but was unsuccessful and finally returned to his father for support.

His first recollection was the birth of his brother. This meant at the time that someone was hurting his mother. At six years of age he experienced a genital thrill from a horseback ride; he recalls pleasure and fright. During the following years he was fondled by many of the adult female neighbors. One of them would frequently hold him between her legs and have him play with her breasts. On occasion she would take him to bed and manipulate his genitals and he, hers. At nine he was taught masturbation by boys, and at eleven an older girl would often lie on him and at thirteen initiated him into intercourse. Thereafter he became promiscuous.

He was made impotent at the slightest suggestion of "dirt" in a woman's underclothes. During the act of intercourse the woman had to wear some article of clothing, as he did not think the nude female attractive.

He married at 23. It was not thought proper by him that a wife should show enthusiasm during intercourse, nor should she expose herself to him. In his sexual relations with other women he more often took the passive rôle and frequently had them perform fellatio.

He found himself attractive to homosexuals. Repeatedly a casual acquaintanceship would lead to homosexual advances. This would ultimately result in his thrashing the homosexual acquaintance. It probably occurred about 50 times. He would often visit a park which was a rendezvous for homosexuals and usually have a fight. The patient himself thought that the left side of his body appeared feminine.

Most often when intoxicated he managed to get into

a fight in which he was usually severely beaten because he would seek a situation with overwhelming odds against him.

His recent illness consisted principally of the hallucinosis. He heard a voice calling "He's a dirty c. s., s. o. b.; let's cut his nuts out." He heard the voice of his wife and of the woman who had fondled him as a child.

He himself insisted that he was a peaceful, quiet person who was willing to take abuse to avoid difficulties or harm to another. His stature he considered a distinct handicap. This meant that as a child he could not fight, or he would have been called a bully, that his athletic ability was belittled. His size as a child made him subject to pursuit by older women. He felt greatly disgusted because the distal phalanx of one finger was removed.

On one occasion he said that all his troubles would be over if his testacles were cut out. For punishment he felt that he should be killed by cutting open his stomach.

To summarize:

1. There is a feeling of femininity (appearance).
2. He believes that he is very often attacked by others.
3. He is often forced to defend himself by deeds of violence.
4. The pretension that he has a gun increases his feelings of strength and masculinity.
5. There are feelings of domination by his father to whom he stands in a passive masochistic-homosexual relationship.

6. There are repeated contacts with homosexuals, followed by his beating them.

7. There has been a passive attitude towards older women since early childhood.

8. The castration motif which is always present was in the foreground in his alcoholic hallucinosis.

9. He expects punishment for his aggressive act, but even that was a method by which he wants to receive punishment.

10. He would like to have his holdup isolated from other problems; that is, he feels it should be regarded as an isolated problem to partially escape the inner responsibility.

11. As with most criminals, he wants to be punished, but not too severely. It is the attitude of the child, who regains the love of the parents after punishment.

The aggressive action in this case is an attempt to attain his full masculinity, which was threatened by the father as well as by the older women. The holdup appears as a symbol for superiority. The alcohol served as a sensitizer for problems which have been present throughout his life. The idea of physical abnormality and femininity form the etiological background. It is probably the cultural and sociological teaching that causes femininity to produce immediately a feeling of inferiority, and the aggressive act—the overpowering of another person—to become the height of symbolization for masculinity. That his libidinous problems finally end in the aggressive act could be due to the particular strength of the libidinous forces involved,

but we have no definite proof of such an assumption. The weakening of reasoning power by alcohol (weakening of ego system in psychoanalytical sense) could be another factor. We have no definite reason to believe that the wish for punishment, although present, is one of the outstanding factors.

Similar problems with a slightly different aspect come into the foreground in the second case.

D. M., white boy, age 16, was admitted to the Bellevue Psychiatric Hospital for observation on November 15, 1934, charged with assault and robbery. In the prison he had simulated an epileptic attack, which fact he admitted after several hours in the hospital. He wanted to be declared insane since he feared that at a reformatory he would be forced to submit to homosexual attacks in *anum*.

In company with another boy he held up and shot a female subway agent. His reason for shooting her was to convince her he was not fooling. He said that because of the pistol he felt courageous, strong, and virile. Immediately after the commission of the crime he wanted to shoot a policeman for the pleasure of watching him fall, but his partner prevented him. Shortly after this he wanted to rape two girls at the point of a gun. After the act he intended to kill the girls. His companion also prevented this.

At the age of 12 years he had been on the psychiatric wards and was considered a behavior problem. Structurally he was described as a feminine type. He scored an IQ of 103 on the Stanford-Binet test. It was at this time that he observed an epileptic seizure.

There was a history of rheumatic fever at the age of five which left him with an aortic and mitral valvular lesion. The patient stated that he recalled much pleasure and enjoyment from the prolonged care and supervision he received during his illness. He also enjoyed a hospital stay for a tonsillectomy when he became the center of attention for the house staff. Particularly pleasant were the repeated examinations of his heart and the fact that he was catered to by the staff. Structurally he still appeared feminine.

This boy had one brother 12 years his senior and one sister 10 years his senior. His father was living and well. When he was five years old his mother was burned to death—in his presence—and he mistakenly believed, because of him. Her dress caught fire. He recalled family life as pleasant until then. The father remarried six months later but separated after four years. He disliked his stepmother. At about the age of 11 years he was sent to a home for cardiac children, from which he absconded several times. He was subsequently placed in several foster homes, and finally was kept at home with his father.

He left school when he was in the seventh grade. The only friends he had were boys who were inferior to him. At school he was frequently abused by boys because of his fear or lack of skill at fighting.

At the age of three he was frequently taken into bed with his mother. He slept in his parents' bedroom until his mother's death. At six years of age he had a dream in which the bedroom scene was reproduced. In it a man had intercourse with a woman who re-

sembled his mother. She was face down. He interpreted this as intercourse in anum. From this he formed the belief of a single orifice in females for intercourse, urination, and defecation. This idea he retained until 12 years of age. At about seven years of age he recalled frequently sleeping with his sister and attempting to play with her breasts and kiss them and to reach for her genitals. He claimed to recall kissing his mother's breast before five years of age and professes a great desire to do so now to other women. At a later age he frequently observed intercourse between his father and a paramour.

Throughout his life he feared sexual attacks "in anum" by boys. At 10 years or so he was markedly aware of it when in a home for cardiac boys. He was more certain that this would actually occur in a reformatory, since he could not properly defend himself. He traced this fear back to his repulsion to enemas at five years of age. He felt that his mother should not "fool around there." At present he masturbates, with fantasies of nude women. This woman is often a teacher who resembled his sister. To date he has had no heterosexual relations. He believes the greatest pleasure would be to suck at a woman's breasts. His father suspects that he was once used homosexually several months before admission. The description of his ideal sexual partner coincides with that of his mother or sister. They closely resembled each other.

As a child he frequently feared attacks by burglars; "that we would be attacked with an axe." He has many fantasies of murdering people in daydreams. At

one time he bought a knife and practiced sticking it into a tree.

He was always afraid of physical pain and combat since he was aware of his marked inferiority, in that he could not defend himself. This was traced to a sound thrashing administered by a boy his size, at the age of six.

In a dream he was walking through grass which made him dirty. He attempted to clean himself with a handkerchief. In association, we learn it is a dream of sexual curiosity with dirtiness associated with sexual relations.

Frequently he dreamed of working with his father, but he was bigger, stronger, and would excel by doing more work.

He has had many dreams of being attacked by a man to whom he said "f- you."

Another dream: "I was walking through a field with a few trees. The snakes were biting me. I could not get away." From association we learn that it is a fear of being beaten and raped. This is also related to his having been whipped in the fight with the boy. He once dreamed of sinking into a marsh up to his knees.

In summary: In the foreground is a fear of passivity, which means to be hit, to be beaten up, or to be attacked; the analytical meaning would be to be castrated. It is partially a fear and partially a wish to be in the female masochistic position. It is possible that his wish of sucking the breast and his fear of the insertion of the penis have a similar basis. The gun is again a crystallization of masculine forces and aggressiveness.

The question again arises, Why do his problems result in action? We are inclined to believe there are two outstanding psychological traumata in early childhood. First is the death of his mother, which must have severely impaired the personality structure;¹ and, secondly, is the long-lasting, debilitating disease during childhood. There may still be other factors which cannot be defined psychologically that prevented a structuralization of the ego in an analytical sense and permitted his doing a criminal act.

We have frequently found that in mentally dull individuals, particularly defectives, the mechanisms are quite clearly brought out. This will be manifested in the following cases, briefly presented.

J. M., age 20, single, no trade. The offense charged was stealing a radio from a home. He had previously been convicted of grand larceny (theft of a car).

This patient had been committed to the observation ward at the request of his parents. They were of sound middle-class stock.

On the Stanford-Binet test he scored an approximate intelligence quotient of 77, computed on the 15-year level. He was uncooperative in his attitude throughout the test.

His birth and development were reported as normal by his parents. Physical examination was negative.

¹ Dr. Lehrman stated at conference that since the mother died by his fault, he must have felt he murdered the mother (by the penis) with the fire, and in order to substitute for it he identifies himself with the mother. He wants to convince himself the murder is not true and he is therefore only play-acting, simulating and not actually murdering. His attitude is an attempt at undoing the primary crime.

He was a slim boy with a suggestive feminine appearance. He had one brother, three years his senior, and an older sister. He has frequently struck his sister and on one occasion, six months before admission, he attempted to strike his father. Since the age of 12 he has had many fist fights. For the most part, he refused to discuss his early life.

His heterosexual life consisted of three experiences, which he did not enjoy. Homosexual persons frequently approached him; he would usually hit them. Often he would go up to their apartments, permit a few preliminaries, and then soundly thrash them. This, he explained, would teach them a lesson. That people laughed at him or looked at him in a peculiar way was one of his beliefs. This he felt was so because of his feminine characteristics which he believed were evident in his face, walk, gestures, and every move.

If released from jail he insisted he would buy a gun and shoot the first homosexual he saw. If sent to prison he said he would have a few fights to convince the men they must not think of him as a homosexual person.

In the following case of a boy charged with a holdup we find the factor of physical weakness and small stature playing a fairly large rôle.

J. U., white, male, age 18, single. His crime had consisted of a holdup of a billiard room. He had two previous arrests, one for breaking slot-machines, and one for grand larceny. He had been committed to the observation ward for "nervousness" while in jail.

His schooling had ended at the first year of high

school, with no failures. At school he played no games and spent most of his time at home, merely sitting around or painting, at which he was said to be talented. He was of dull normal intelligence.

He had had a few heterosexual relations since the age of 16. In jail he dreamed of other inmates, jumping on top of him, or beating him. This frightened him so that he awoke screaming. His great fear of prisons was that he would be forced to submit to homosexual advances, since he could not fight and defend himself. In addition, he also feared that once his resistance was broken down he would prefer such relations. His early childhood concept of female genitals was that girls had had a penis cut off.

Physically his ambition was to be bigger and stronger, and thus more virile. He was an undersized boy with underdeveloped musculature.

In another case of a colored boy, *C. T.*, age 21, who was *defective mentally and seemingly psychotic*, the mechanisms are vividly presented.

He was charged with felonious assault. He had attacked a man at an Emergency Relief Bureau because he felt that he had been dealt with unfairly. The reason for this unfairness, he believed, was his refusal to submit to homosexual advances. His personal history was unreliable. He had experienced many types of homosexual activities. At times he would turn on his partners and beat them. Regardless of where he travelled homosexuals sought him out. The greatest sexual pleasure for him was to assume the masculine rôle in pederasty, the only form in which he admitted

indulgence without pay. When asked how he would feel if his victim died, he replied, "I would feel like a real man. Anybody would if they killed a fellow who bothered you."

In many of the cases of armed robbery, the aggressive act is a defense against an attack which occurred in early childhood. This is rather sharply evident in the following short history.

V. L., white male, age 25, was arrested for pocket-book snatching. He was transferred to the observation ward for attempted suicide by lacerating his wrists. Previously he had been incarcerated for burglary, burglary and assault, and for carrying a gun.

His mother had been a dominant force in the family; she was so severe and strict that two brothers and one sister left home. She frequently punished him with a whip, restricted his play to their own yard, and forbade him to fight, regardless of how badly he was hit. Sexual experiences began at the age of 11 when he was attacked with sticks by female classmates who were jealous of his scholastic record. Thereafter his school record dropped. A short while later his mother accidentally hit him with a strap on the genitals. At 12 his mother observed him with an erection and accused him of masturbation. To avoid further erections he sewed his foreskin together. At 14 years he masturbated with an awning ring which had to be filed off. At 15 he was accused by his mother of sexual intimacy with a girl. He became incensed and ran off to join the army. There he fought against sodomy. Later in a reformatory he again had many fights because of this.

In this case we see a passive, masochistic childhood which served as a foundation for later aggressive activities. He too fights against his passive rôle. These same mechanisms may play an important part with our murderers.

K. DeV., white male, age 46, Armenian, had shot and killed a competitor, a peddler. For several months preceding his offense he believed he was pursued by the Communist Party for being an informer against them. The day of the murder he heard that he was to be "put on the spot" at three o'clock that afternoon. Later, after a few words of argument he shot the man, who died soon afterwards.

He was born in the Ukraine in a small town. There was a large family of female cousins, and he was the only male. His mother died when he was between one and two years of age. He believed an older sister was his mother until he reached nine years of age. The many females in the family made a fuss over him, showering him with kisses and caresses. These he resented to an extreme degree as a child, recalling that he would wipe his mouth after a kiss. He refused to discuss exactly what other form the caresses took.

The only real love he admitted was for his sister. He stated that he never liked women, but almost immediately afterwards boasts that women complained that he had too much for them. He had associated mostly with men of a vigorous type and despite the constant kidding and feelings of persecution he persisted in going with his cart to the waterfront, in order to be near longshoremen, taxi drivers, etc.

In one dream he describes, he is with his sister, at sunrise, on a hill. She walks to him then stops; she talks but never approaches him. In this case the patient has delusions of aggression by others and we may assume this delusion repeats a situation in early childhood.

With two cases of murder in connection with infidelity of the wife, the aggressive act was apparently a regaining of virility. In the following case, the patient felt he was forced into an inferior position because of his homosexuality. He expressed his virility by killing his partner in the relations.

F. F., age 23, white male, electrician by trade. His early childhood had been uneventful. He was graduated from elementary school at the age of 14 years; during school years, he had friends and was well liked by teachers. There was no history of nervousness.

The reason for his transfer to Bellevue observation wards was two attempts at suicide by hanging.

Six months previous to the commission of the crime, his victim had seduced him by committing fellatio after alcoholic indulgence. The relation existed for six months. The partner was a bigger, huskier, and more virile looking man, whose personality dominated and swayed the patient. He claimed to have attempted to break up the relationship but was threatened by his partner. On the day of the murder, he was arguing with the paramour and threatened to leave him when he was attacked. In self-defense he hit him with a lead pipe.

In almost grotesque form the same problems reappear in the following case.

I.P., age 35, white male, charged with bigamy and suspected of the murder of his second wife, who disappeared shortly after their marriage. He was interested in banking enterprises early in life, but did not retain his position. He developed a business of his own, dealing in money, and an interest in inventions of an impractical nature (locks and keys). The patient had served as a captain in the Yugoslavian army.

His manner was suave, smooth-spoken, and over-courteous. Underneath his generous manner, however, he was sharp-witted, sarcastic, and, when under pressure, biting. Later contacts with this offender showed that he had considerable impulsive aggressiveness. He had bisexual tendencies and could enjoy perverse and masochistic types of sexual activity, but could and had made a heterosexual adjustment. In his letters were described all sorts of perverse sexual activity with his first wife in which he longed for the female rôle and regarded her as the male. He discussed the orifices of his body as vaginae and the pleasure of receiving into his body. His manners were feminine.

Another point of importance was his emotional instability, which broke through at times. When he could no longer control his aggressive feelings or his contempt for society or for individuals whom he had duped or tried to hoodwink, he burst out with a volume of emotional aggression in the shape of irritability, sullenness, and negativism. This emotional change was rather sudden and even explosive. It shows the deep underlying aggression which was successfully covered and controlled in his ordinary behavior. It appears

to be a very important facet of his make-up. This attitude shows hysterical petulance and a definite childish emotionality. The behavior at times is like that of a child in a tantrum. If he cannot get what he wants, he either becomes mute (uncommunicative) or flies into a fury.

In this case, one has the impression that he has built up the enormous defense mechanism in a rather queer way against something lying much deeper. We may perhaps feel that in the deeper layer there is an enormous aggressiveness.

These nine cases show the different aspects of the rather large amount of material studied. The study of our cases and a parallel study of children, neurotic patients, and normal adults leads to the following theory concerning the aggressive instincts.

The aggressive instincts of early childhood meet with obstacles which are imposed by adults. These checks on the child's aggressiveness may be physical, or may take any form of punishment, or may even be a threat of punishment (castration in the widest sense). Thus, the aggressiveness becomes suppressed, and the child is forced into a passive, non-aggressive attitude. However, the passive attitude is not merely an outcome of punishment, fright, and intimidation. It is not only natural to be active and aggressive but also to be passive and submissive. Forcing the passive attitude by adults might even bring psychic relief since the individual can now enjoy passivity without the obligation of more or less dangerous encounters—fights. Passivity may therefore be one of the normal characteristics and tend-

encies of human beings generally. The child would perhaps remain in the passive attitude if he did not fear attacks by others. Fear hinders the full enjoyment of passivity, and, in addition, activity and aggression are not erased by the inhibitions put upon them. Instead their energies are stored and are ready to be brought forward at any time.

As analytic studies of normals show, the cultural influences connect passivity and submission to femininity, and activity and aggression to masculinity. Thus the problems of activity, aggressiveness, and passivity become closely interlocked with libidinous problems in the narrower sense. To be passive means almost to be feminine, castrated, and ready for vaginal or anal abuse.

In the educational process the parents have the rôle of checking, shaping, and redirecting the child's aggressiveness. Because it is their task to force the child to give up activities, they take the part of the aggressor in the child's mind. The aggressor at first seems to be the father, but on deeper analysis one finds instead the dim figure of the mother as the aggressor. She uses the penis as a weapon in quite the same way as the father. It is not our plan to go into the details of the libidinous structure involved.

If the individual intends to remain in the passive rôle, he may remain a passive object to both father and mother. He may even withdraw one step deeper, give up his separate existence completely, and perhaps find shelter by returning to or into his mother. But, as stated, human beings cannot remain in a state of

complete passivity. The activity and aggressiveness must come back and will be the stronger the more they have been repressed.

In the so-called normal development there is a continual, almost rhythmic flow between activity, passivity, aggressiveness, and submissiveness. This very fine balance can be easily disturbed.

Our material clearly shows that a disturbance of this balance may come by overseverity on the part of the father and mother, as in Case *V.L.* The individual will more or less vigorously protest against the enforced passivity and does so with an increased aggressiveness. For him passivity means to be feminine, to be castrated, and to be used anally. It may have a similar effect on others, as in Case *H.K.*

It is paradoxical that an overindulgent attitude towards the child in education, at least as regards our material, does not increase the aggressive impulses. In our material aggressiveness is not a release but a counter-reaction. In our experience an increase in aggressive impulses, when not counter-reactions, is found only in hyperkinesis of an organic basis. Even then the single outburst may very well be reactive in character.

The passivity against which the individual protests may not be a protest against the severity of education. The feeling of passivity may have arisen from the fact that the child received the impression that it is physically weak (Case *I.U.* and Case *D.M.*) or abnormal physically (*H.K.*). The important point is not that the child is weak or abnormal, but that it is impressed upon him by parents, other adults, and his mates. To

ed he would touch or kick men in the rectum or penis.

Heterosexual feelings had always been present, at times in connection with his mother. At 16, his mother forced him to break his friendship with a girl.

At 13 an important homosexual experience occurred. He was seduced into sodomy by an older man who used him in the passive rôle. The affair continued for about three weeks. It was at first painful. The patient did not know, up to the time of the analysis, the difference between the male and female sex parts, and supposed that intercourse normally took place through the anus of the woman. He claimed he was asked to submit to sodomy by three other men at different times and refused, but admits a pleasurable sensation.

Since the first experience referred to, the patient began to feel an urge to do the same to others and also to kick people in the rectum. He experienced a "nervousness" in his penis, particularly in crowds.

Patient had slept with his brother and at times they have embraced and played with each other, though not having actual intercourse. At one time the patient left home and lived at the Y. M. C. A. in order to avoid temptation. He also feared to walk out-of-doors because of possible attacks.

The mother's influence in this case was great. The patient felt some aversion for her, calling her slovenly. She had been accustomed to undress in his presence, and he still felt some excitation on such occasions and also when merely with her.

Masturbation began at 11, with the accompaniment of homosexual fantasies. He would steal silk under-

wear from his mother, urinate in them, and wear them soiled. At seven he wanted to wear little girls' under clothes, or his mother wanted him to; he does not remember which. After his homosexual experience he often masturbated with fantasy of sodomy.

As a child, he thought women had penises, and he thought of intercourse as a fight between two penises. He particularly feared being pushed into the passive rôle by his mother and was afraid she might insert her penis into his rectum.

The patient's father died of pneumonia when the patient was seven. The father bought him a set of electric trains. At night he would put candy in the sleeping children's mouths. The mother, however, said that the father had a bad temper and was hard to get along with.

Once, upon looking at a chocolate pistol, he thought of the penis, of the bullets as sperm, and the shooting of the pistol as an orgasm.

The father was a court attendant and used to carry a pistol. Pistols, guns, and battles appear repeatedly in the patient's dreams. Homosexual, heterosexual, and prostitution motifs figure in the patient's dreams. In one dream he takes a duelling sword from a museum at the order of a baby-killer, but returns it and is given cigarettes by some one as a reward. The sword was protected by a white guard. The dream shows his wish to get hold of the sex organ of the combined parents' image. He is compensated for not doing so by regaining his smaller genitals.

One dream was told by the patient as follows:

We were in a room, my brother, a man, a woman, and myself. Also my mother. There was a panel in the wall. One panel had a secret lock on it. I knocked on the wall to see whether there were any hollow spaces. I found a button, I pressed it, and the panel slipped back. There was a gun set in the wall, so that it would go off and kill. I stepped aside and told it to the others. The gun did go off. After it went off there was another kind of panel. It was a jigsaw puzzle in the side of the wall. It hid the contents of the safe. When that went away I put my hand in and took out five or six eggs. The eggs fell down and broke. I put my hand in the yolk substance and told the others to do it. They all did it except one man and a woman. (After this there was a break.) Later on the man and woman committed suicide. My mother was in the room too. In the safe there were no valuable things, only some chinese works of art, like the horn of an ox, polished and cut down the center. There was a cavity in it. We were disappointed. I took these things.

The dream repeats again and again the motif of the danger and mystery of sex.

The aggressive impulse of this patient does not come out in action. There are compulsions. The repressing forces are too strong to allow the aggressive action to come out openly. In comparing this case with criminal cases one will also realize that much more of the sexual material in its narrower sense is in the consciousness. The libidinous structure is similar to the cases observed. The patient is suppressed by a strong mother who on her part was fighting against the father's tendency to violent outbursts. He is pushed into a passive position and feels inferior to father and mother, the genitals of whom he is afraid. He also wishes to be anally passive in relation to them. In counterbalance to his passiv-

ity, he identifies himself with his mother. The soiling of her underwear puts her in the rôle of passive excitement and he himself is active and passive at the same time. But he has another way of escaping his passivity besides identifying himself with his mother; he gets the desired object (the powerful penis) also, by theft as reflected in the dream. A further method of regaining his activity is in fantasies of raping boys and girls, kicking men and women in the legs or genitals, and, finally, stabbing his mother in the genitals. He performs all of these activities in his compulsions, which mean regaining masculinity, genitality, and power. The patient retains a good contact with other human beings, has a well-organized ego structure, has interest in radio and mechanical things (which is in connection with earlier experiences of his childhood when the father brought him mechanical toys). The libidinous conflicts are seemingly not sufficient to disrupt the structuralization of his personality.

Why the aggressiveness in our cases became criminal acts remains. In the first patient (*H.K.*) the aggressiveness becomes criminal when he overindulges in alcohol, and the whole structure of the personality is disturbed; the ego loses its structures in the psychoanalytical sense. In our opinion the ego is not merely the sum of the aggressive instincts from an analytical point of view. In the second case (*D.M.*) the ego system was not developed in early childhood because of the burden of early libidinous conflicts and the long-drawn-out physical disease. In the third case (*J.M.*), who has poor intellectual ability, the homosexual conflicts are

particularly strong. In the next case (*J.U.*), physical weakness was an accentuating cause, and in the colored boy (*C.T.*), psychotic and mentally defective, the whole system of inhibitions was lessened. The sixth case was particularly traumatized by women during adolescence. In cases *F.F.*, *DeV.*, and *I.P.*, we have no hints of primary weaknesses in the structure of the ego, but one has the impression of particularly strong and primitive libidinous conflicts.

One would conclude that aggressiveness comes to criminal acts when we deal either with specific defects in the ego structure or with an overpowering of the ego system by particular libidinous conflicts of especial strength or primitiveness.

The structure of the ego is also dependent upon the social environment. This would mean the home environment, the economic status of the family, and the question of broken homes. The cinema, too, plays a part in the development of the ego. The ideology of their immediate neighborhood companions is undoubtedly a factor in the release of their aggressive impulses into crime. There are sections in every city which are noted for their contributions to crime. In these sections the ideal of the child and adolescent is to simulate some gang leader and to be able to point with pride to criminal activities or arrests. The influence that schools, teachers, etc., might exert on the structure of the ego is no less important.

One frequently gains the impression from criminals that they have an emotional flatness, that they do not regard a life of crime seriously. It all seems to be a play

for them. They want the irresponsibility of children and do not plan for the future. It is most difficult for them to think in terms of their future lives. The horizon which they scan is little beyond the immediate present. To think and imagine a situation in years to come is a ridiculous problem to them. This inability to judge the future is in close relationship to the incomplete development of the ego system. We have shown that this incomplete development of the ego system in many cases (1 to 6) is a primary impairment of ego system. It is doubtful if in Cases 7, 8, and 9 the ego system is stunted only by the libidinous conflicts of great strength, or whether there exists another weakness of structure of the ego which we cannot psychologically define at present, or if there is, a primary weakness.

Our studies concerning women are still incomplete, but we believe that the mechanisms are basically identical. Out of the 2982 cases for the year, there were only 99 women, 25 of the charges being assault, and 5, murder and manslaughter. It is astonishing that despite the fact that there is no difference in their psychic aggressiveness, assaults are infrequent.

H.R., white female, age 37, widow, had four admissions to the observation ward over a period of four years. The first admission was in August, 1931. At that time she had a depressive state following a disappointment by a sweetheart. She had furnished a home, left her job, and stated that the wedding day was set when her sweetheart went to live with another girl. She then attempted suicide. She improved rapidly in four months and was discharged on parole from the

state hospital. In the hospital she felt persecuted by others. On the second admission in July, 1933, the patient was admitted as a prisoner charged with manslaughter. After some alcoholic indulgence she became embroiled in an argument over the liquor bills of her paramour. Later she began to argue with him, claimed that he was attacking her, and threw boiling lye over his head. He died soon after. The victim was 65 years old. The defendant was acquitted on her story of self-defense.

The third admission was in July, 1934. She was then in a state of wild excitement and alcoholic. She was screaming and yelling. There were many paranoid ideas about her sister, whom she threatened. She eventually quieted down, revealed no hallucinations, was cooperative, and was discharged on contract to her sister. Her fourth admission was the following November. At that time she had hallucinations and paranoid ideas. She believed seven men were chasing her, were calling her bad names, and talking of killing her.

There is always the same pattern of being attacked by men and having to defend herself. This she does with a terrific outburst of rage on each occasion, at one time killing a man.

V.B., white female, age 19, was the adopted daughter of a brother and sister. She discovered this fact at 13 years of age, became depressed as a result, and attempted suicide. This was prevented by a passerby. At the present time she is a patient in the observation ward because of a suicidal attempt with iodine.

In brief, her history reveals that she was a masculine type of girl who preferred the company of girls. There was a female companion with whom she often slept. She kissed and hugged this girl but had no homosexual relations with her. She enjoyed activities such as swimming, dancing, etc., and wished to be strong more to enjoy exercise. She had resented her girlhood because she could not climb trees, fish, and play ball. She was described as boyish. For several years she had run a gasoline station which was owned by her foster parents. She had two men working for her.

At 15 she became impregnated by a boy who was subsequently taken into her foster mother's home where he usurped her place. Her parents felt that she was to blame for everything. She in turn, to hurt her mother, married someone inferior to herself. This marriage was annulled six months later. She did not enjoy the sexual relationship. Her next sexual affair was one and one-half years later with a policeman, with whom she experienced her first orgasm. She accidentally shot the policeman immediately after intercourse, from which she felt very weakened. She had probably heard a short while before that he was a married man. She had attempted suicide because she had indulged in intercourse the night before admission and felt humiliated by it. Although the patient insisted she was very feminine she continually aspired to masculine strength in her actions. She apparently considers the orgasm as weakening, and reacts to the weakness, which she links up with femininity unconsciously, with the accidental shooting of a lover whom she otherwise has reason to blame.

As mentioned above, our studies concerning women are incomplete. No fundamental psychological difference appears in men and women concerning aggressive tendencies, but it is part of the social ideology that the female need not resort to physical prowess to demonstrate superiority, nor is it necessary to demonstrate any. However, further studies are necessary.

In addition to the individual case histories our patients were studied by use of a questionnaire. The questions were formulated after lengthy discussion with the patients. We believe that their answers will substantiate some of the conclusions derived from the individual study of cases. The questionnaire was submitted to 25 non-aggressive criminals, 25 aggressive criminals, and 25 non-criminals. The last group varied in their social standing from business men to evening high school students. As a rule they were of a higher social level than the criminals. In many instances it was necessary to discuss the questions with the patient in order to give him a proper understanding of their meaning. The number of cases used in this statistical study and the heterogeneous character of the non-criminal group does not permit of the drawing of definite conclusions. However, we feel that some conclusions can be drawn.

We will next present a tabulation of the replies to the questionnaire with some sample answers.

The last case (*P.D.*) is a man who murdered his wife by stabbing, for infidelity. His answers show a great amount of passivity. His personality and background was that of a quiet, passive individual who had probably never before been aggressive in any way. He had

TABLE 1*
QUESTIONNAIRE

Questions	Answers	Aggressive criminals	Non-aggressive criminals	Non-criminals	Comment
1. What is courage? Give instances	Courage considered as moral quality Courage considered as physical quality	5 18	10 15	13 12	More of the aggressive criminals regard courage as a physical quality.
2. What does it mean to be a coward? Give instances	Cowardice is a moral quality Cowardice is a physical quality	9 16	15 10	13 12	This too has more aggressive criminals regarding physical quality as cowardice.
3. Why not be a coward?	Other's opinion Self-defense Not manly It's just bad Unclassified Hinders in job Not bad to be coward	10 1 4 7 0 2	10 4 4 3 4	3 5 4 8	Criminals regard opinion that they are cowardly as most important. Non-criminals mostly say it is not harmful.
4. Do you ever like to hit a man?	Yes No	2 22	3 22	11 14	Non-criminals express their aggressivity freely.
5. Is it ever right to hit a man?	Yes No	13 7	14 11	17 8	
6. Should one ever fight with a stronger man?	Yes No	13 7	14 11	18 7	
7. Should one fight with a weaker man?	Yes No	15 10	13 12	15 10	
8. Is it ever right to hit a woman?	Yes No	3 22	3 22	13 12	Non-criminals express greater aggressivity against women.

*In table 1, many of the answers do not total 25, as frequently individuals refused answers or they were so complex that they could not be grouped with any of the others.

TABLE 1 (continued)

Questions	Answers	Aggressive criminals	Non-aggressive criminals	Non-criminals	Comment
9. Is it right to hit a woman who is stronger?	Yes No	6 19	3 22	12 12	Greater tendency to aggression is expressed in non-criminals. One's aggressivity is justified by self-defense.
10. Would you let a smaller man hit you?	Yes No	8 17	11 14	1 24	
11. Is it right to strike back if hit?	Yes No	22 3	21 4	21 4	
12. When is it right to hit somebody?	Self-defense Never For insults	16 5 4	19 4 2	15 3 4	Again non-criminals express aggressivity more freely.
13. Would you like to shoot (kill) somebody?	Yes No	0 25	0 25	2 23	
13A. Is it ever right to kill anyone?	Yes No	1 24	0 25	4 21	
14. Would you like to kill somebody with an ax?	Yes No	0 25	0 25	1 24	Aggressive criminals and normals express the desire for physical prowess.
15. How would you defend yourself against a stronger man?	As he does Pick up anything Run away Reason with him	9 5 7 4	16 4 4 1	10 9 4 4	
16. Are you strong?	Average No Yes	6 11 8	4 9 12	8 10 5	
17. Would you like to be strong? or stronger?	Yes No	19 6	14 11	22 3	
18. Would you like to be weak?	No	25	25	25	

TABLE 1 (continued)

Questions	Answers	Aggressive criminals	Non-aggressive criminals	Non-criminals	Comment
19. Why is it important to be strong?	Self-defense Manly No importance Useful at work Appearance Shame Sensation of feeling strength	8 2 5 6 1	3 5 8 2	7 5 8	Five non-criminals desire sensation of feeling strong.
20. How often do people harm you?	Often Rarely	9 12	7 12	2 23	Criminals, especially aggressive ones, feel harmed more often.
21. How should criminals be punished?	Present system Pay back money Moderation on first offenders Therapy	13 1 4 2	13 2 2 3	12 11	Criminals insist upon punishment for crime more than normals, but are less insistent on capital punishment.
22. Is capital punishment ever justified?	Yes No	16 9	12 13	20 5	
23. Are you good or bad?	Average Good Bad	9 10 6	5 16 4	22 3	More non-aggressive criminals consider themselves good.
24. What is right or wrong sexually?	All considered perversions wrong, and, in addition, others named marriage and conventional ideals.			Four consider any way that persons enjoyed as right.	
25. What do you aim for in life?	Wife and family A job	5 15	10 8	Contentment Happiness Security To reform people Financial wealth	Narrowness of aims characterizes the criminal.
26. Are you a success in life?	Yes No	7 13	3 22	5 13	

TABLE 1 (continued)

Questions	Answers	Aggressive criminals	Non-aggressive criminals	Non-criminals	Comment
27. What do you want to reach?	Engineer Army Electrician Captain of ship Fireman Chauffeur Mechanic Farmer Any job	1 Engineer 1 Photographer 1 Physician 1 Dentist 1 Business man 1 Factory owner 1 Lawyer 13	2 Physician 1 Teacher Knowledge of world Cultural development		The aggressive criminal wants the more physical masculine occupation.
28. How much do you need to be happy?	Average	\$20	\$40	\$60	The financial ambition of the aggressive criminal is less than that of non-aggressive ones, or the latter is less ambitious than the normal.
29. What do you consider a good time?	Movies Drinking & eating Dancing Intercourse Travel Conversation Wife and kids Sports	11 4 1 2 1 4 4	12 1 2 2	Books, music, travel, theatre, conversation.	
30. Should you be a hero?	Yes No	19 4	16 7	11 14	Criminals, especially those of the aggressive type, feel greater urge to be heroic.
31. Who are your heroes?	Lindbergh Dempsey Life saver Actor Dillinger Captain Freed Ford Roosevelt None	10 1 1 1 2 1 1 1 1 6	2 Washington 1 Lincoln 1 Fireman 1 Lindbergh 2 Pershing 1 War heroes 1 Generals 1 None	2 LaGuardia 1 Lindbergh Goethe 7 Jesus Christ 2 Lincoln 1 God 1 None	

TABLE 1 (*continued*)

Questions	Answers	Aggressive criminals	Non-aggressive criminals	Non-criminals	Comment
32. Are you good looking?	Average	8	8	7	
	Yes	3	2	6	
	No	13	14	12	
33. What do you think of war?	Wholesale murder	9	8	9	
	Cruel	5	Unnecessary		
	Exciting	1	Sacrifice of		
	No good	8	2 lives	7	
			+ Murder	+	
			No good		
34. When is war justified?	Never	6	15	16	Aggressive criminals are justifying war on principle of self-defense as with personal combat.
	Self-defense	19	9	9	
35. Would you fight in a war?	Yes	20	22	13	
	No	5	3	12	
36. Would you rather be a live coward or a dead hero?	Dead hero	12	11	1	The professed heroism of the criminal is greater.
	Live coward	6	6	25	

SAMPLE ANSWERS

J. U.

1. Valor, bravery, nerve. *When you save somebody from drowning.*
2. Not making an attempt to save a drowning person would be cowardice.
3. It isn't supposed to be good to think more of yourself than of the other man.
4. No.
5. *Some cases. Self-defense.*
6. Not if you can avoid it.
7. No.
8. No.
9. No.
10. No.
11. Some cases.
12. *In case he hits you first.*
13. No.
14. No.
15. With my hands.
16. No.
17. Yes.
18. No.
19. *If you're strong you're healthy.*
20. No more than anybody else.
21. They way they're being punished now.
22. *In case of murder.*
23. I wouldn't say either. I'm in between. I wouldn't take advantage of anyone if I could help it.
24. *Homosexuality is wrong.* Extra-marital intercourse is supposed to be wrong. *Perversion is wrong.*
25. I aim to be an artist — portrait-painting.
26. No. You can see I'm no success.
27. I want to reach the outside.
28. \$50.00 a week.
29. In the country. Vacation.
30. It's up to him.
31. Lincoln. To tell the truth I have no heroes. Didn't have any when I was young.

32. No. No.
33. I can't answer that.
34. Can't answer.
35. *Yes. Because I'd have to. I wouldn't want to be called a coward.*

J.M.

1. *Not to be afraid to fight. He does hard things. A fellow swam the East River.*
2. *Scared of everything. Hits you when you're not looking.*
3. *I don't want anybody to say I'm yellow.*
4. If they hit me.
5. Yes.
6. *I don't care if he's strong or weak.*
7. *If he hit me.*
8. Maybe at times — like a loud-mouthed person.
9. At times.
10. No.
11. Yes, damn sure.
12. *When you're hit, if they say something out of the way, like s.o.b., c.s.*
13. (After hesitation) No, unless they shot at me.
- 13A. I don't know.
14. No.
15. My fists.
16. Half and half.
17. Yes.
18. No.
19. *Good for boxing, to defend yourself.*
20. Yes, they make me feel bad often.
21. Put away.
22. (After great deliberation) No. (*If somebody shot your mother?*) No—I'd shoot him myself.
23. I don't know.
24. *Have a woman.*
25. Engineer.
- 26.
27. Engineer.
28. About \$30 a week.

29. Get good and drunk. (*Alone?*) Yes, prefer it.
 30. Yes, if they can.
 31. *Dillinger.*
 32. No. I don't know (physique).
 33. Good (no further).
 34. When there is too much population.
 35. Sure.
 36. Dead hero.
- F.F.*, 24, manslaughter, 2nd degree.
1. Bravery, faith, optimistic. Saving a life from drowning when your own life would be in danger.
 2. Fearful. Imaginative fear. Afraid of a life. Pessimism.
 3. It's usually imagination. Anyone who has any religion hasn't anything to be fearful of.
 4. No. I'm not sadistic in any way.
 5. No.
 6. *In self-protection. If any way of avoiding it, that's the best means.*
 7. No.
 8. No.
 9. No.
 10. No.
 11. To protect myself.
 12. (*As above.*)
 13. No.
 - 13*A*. I don't think so. Not if you can protect yourself without it.
 14. No.
 15. That I don't know.
 16. Yes, quite strong.
 17. Yes.
 18. No.
 19. To work and for health and ambition.
 20. *Not very often. People have never harmed me, but one.*
 21. *They should be treated, I think, mentally.*
 22. No.
 23. Normal.

24. A man and woman in love with one another is right and natural. Prostitution is degrading. Extra-marital intercourse is O. K. Perversions are wrong. Homosexuality is wrong.
25. Contentment. Nothing specific to look ahead to just now. Peace of mind.
26. Just now I don't think so, but I hope to be.
27. Engineering.
28. Enough for a living. Being single, \$25.00 or \$30 a week.
29. Company of girls and fellows, a sociable crowd.
30. Courageous. I don't know about heroes. Doing something for the next fellow is heroism enough.
31. Washington, Lincoln, Roosevelt, etc. The One I really look up to is Christ.
32. I don't know whether I'm good-looking. Fair physique.
33. I'm a pacifist.
34. *I can't find war to be justified.*
35. Hard to say.
36. *Live coward. But one might be glad to forfeit his life for a loved one.*

K.DeV.

1. A good fighter.
2. Opposite of that.
3. People say he's no good.
4. No.
5. If you are hit.
6. Sometimes you are forced to.
7. Yes.
8. No.
9. Yes.
10. No.
11. Yes.
12. *When you are hit.*
13. No.
- 13A. Yes.
14. No.
15. Pick up something.

16. Not very.
17. Of course.
18. No.
19. *Working class — man is forced to fight.*
20. *Yes, people talk behind my back.*
21. *According to their crime.*
22. No.
23. Good man all my life.
- 24.
25. I wanted to be a civil engineer.
26. No.
27. Nothing.
28. \$30 a week — by myself.
29. Go with a good friend to a show and talk, play cards for fun.
30. Yes — we see statues of people after we die.
31. A man who sacrifices his life for somebody else.
32. Of course not.
33. No good, cruel.
34. If it is forced on you.
35. *If others attack us — yes.*
- 36.

P.D., murdered wife for unfaithfulness.

1. *Fellow who fights.*
2. *Afraid to do anything; fights and runs away.*
- 3.
4. No.
5. Never.
6. Never.
7. Never.
8. Never.
9. Never.
10. Yes.
11. *No — go away.*
12. Never.
13. No.
- 13A. No.
14. No.
15. Run away.

16. No.
17. No.
18. No.
19. *I don't need or look for trouble.*
20. Rarely.
21. According to the way they do it.
22. If they kill for money — go to chair.
23. I was until I killed my wife.
- 24.
25. I never had a chance. My father made me work to send him money. Gave me no chance for education.
26. No.
- 27.
28. \$50.
29. My wife and I go to movies.
30. Yes. I help protect my country.
31. Lindbergh.
32. Yes. I'm just right.
33. War is no good.
34. When either party pushes you, wants to fight, and when they come after you.
35. I'll be the first one — I live here.
36. Dead hero — that's why I want to go to the chair — either that or free so I can go with my face high— clear name.

withstood a considerable amount of real or imaginary abuse from his wife for several years before it culminated in the murder. The tremendously aggressive act seems here to be a reaction to an enormous passivity.

The questionnaire revealed the following interesting observations. In questions 1 and 2 we find that more aggressive criminals regard the physical quality as a definition of courage and of cowardice. It is noted that criminals regard the opinion of others as an im-

portant reason for not being a coward, whereas non-criminals do not think it is so harmful. In questions 4, 10, and 13 we observe that non-criminals express their aggressiveness more freely than criminals, and a remarkably greater aggressiveness against women is expressed. There is a frequent justification for aggressiveness by self-defense. More of our aggressive criminals and non-criminals express a desire for physical prowess and five non-criminals desire the sensation of feeling strong. It seems that criminals more often feel that they are the abused. Concerning punishment, the criminal insists upon it more often than the non-criminal, but fewer justify capital punishment. We learn that criminals' aims in life are narrowed, and that the aggressive criminal wants the more physical occupations. Also, the financial ambition of aggressive criminals is less than that of non-aggressive criminals, and both have less ambition than non-criminals.

The criminals, especially aggressive ones, feel an urge to be heroic and even prefer being a dead hero to a live coward. This is in marked contrast to our non-criminals. As with personal aggression, war is justified with principles of self-defense.

Thus, a study of our questionnaire confirms and enlarges the results obtained by studying case histories. Aggressiveness would seem to be a reaction, a mechanism for self-defense against real or imaginary aggressiveness of others. We seem to need this feeling (of self-defense) to have the courage to display aggressiveness. Physical aggressiveness is seemingly connected with the specific ideology that the physique and physi-

cal prowess are of particular importance. This is a point of view discarded by facts but retained in our thinking. It would be wrong to think that physical victory is felt merely in the realm of reality. It is astonishing how uniformly the opinion is expressed that one should hit neither the weaker nor the stronger, which is obviously preposterous from a practical point of view. They seem to regard fighting as some ordeal out of which abstract justice should prevail. But someone must be the initial aggressor and it would seem that the real or imagined aggressivity of others must be had. To do this, people seek a situation for self-defense, so that they may live out greater aggressiveness. Humans seem to be constantly trying to hurt others and seem to have an uncanny instinct for finding their most sensitive points.

Objective observation shows that humans are continually striving to show their superiority to others and to hurt them. They receive pleasure from subduing them, and perhaps from their suffering. The "unconscious insight" (Brill) of the universal aggressiveness of others and ourselves makes continuous self-defense necessary.

The non-criminals are much more free in their verbal expressions of aggressiveness. They are not aware of the same feelings of inferiority, etc.; their tensions are more balanced. They do not need the reassurance of physical activity to produce a sense of equality. They do not react to strong inner aggressiveness with strong passivity, which makes the whole system more labile, so that psychic aggressiveness occurs easily. They can afford to express non-aggressiveness.

A preliminary study of non-criminal women shows that they express their aggressiveness even more freely on the questionnaire.

It would appear that our present society is in fear of passivity and femininity, which are erroneously associated. In some fashion the notion has become fixed that one must continually strive to maintain the dignity of masculinity. It is believed that masculinity is the ability with fists, and it is believed too strongly that we have to defend ourselves with mere physical strength. It is clear that, when libidinous difficulties of any kind arise, this whole system of ideas will increase the tensions between passivity and activity. Then if the super-ego or ego are not sufficiently strong, an explosion into the criminal act will occur. But the same will occur if the organization of the ego structure has been defective because of early libidinous conflicts, long lasting disease, or by organic factors which cannot be defined psychologically at the present time.

If we cannot radically alter the sociological factors, or believe it is impossible to do so, we may do something through education by eliminating the ambition to excel in physical strength and mentality. Perhaps we ought to teach the right of the weak not to fight and to assure humans of their inner values even if they are neither mentally nor physically superior. It might even be worthwhile to yield some of the masculine pride and not to identify any longer passivity, femininity, and inferiority. This could be a principle for education as well as therapy.

SUMMARY

We have presented the case histories of criminals and an analysis of the replies of 50 criminals and 25 non-criminals to a questionnaire. From these studies we conclude that in many instances aggressive action is a reactive state resulting from a sense of passivity. This passivity is frequently felt as identical with homosexual trends and fears of anal abuse, and is often felt by the individual to be synonymous with femininity. He therefore attempts to overcome his sense of femininity by acting out those attributes which are commonly considered the earmarks of masculinity, that is, aggressive behavior.

This original sense of passivity is at times reactive to overwhelming severity of the educative forces in childhood, so that none of the native aggressiveness can be expressed, but only held in storage. This energy when released shatters all the hitherto restraining forces and frequently becomes an exquisite expression of masculinity and aggressiveness.

In others, a native physical weakness, or some abnormality, is so stressed that the individual feels forced psychically into a submissive rôle. But his aggressive forces also will not accept a denial of all outlets.

That non-criminals can so very easily express verbally their aggressive desires is indicative of the smoother flow of tensions from aggressivity to passivity. There are no wide swings of the pendulum, but a moderate arc is described in the swing of their aggressive and passive impulses. The criminal expresses and frequently lives a markedly passive existence, save for, or until,

his criminally aggressive acts. This is frequently observed in the adolescent holdup boy.

A fundamental causative factor seems to be our socially conditioned concepts regarding masculinity and femininity. Thus, passivity is felt to be feminine, aggressivity, masculine. A male needs to fight off any sense of femininity by physical activity—a masculine trait. Perhaps we can teach that both are present in all and that the one is no more expressive of femininity than the other is of masculinity.

The organization of the ego plays an important part in the problem. The ego function can be impaired either by libidinous conflicts in childhood or by a structural impairment. But the ideology plays an important part, as when the individual values physical fitness or prowess greatly, or when the environment approves of illegal violent behavior.

REFERENCES

1. ADLER, A. *Der Nervöse Charakter*. Wiesbaden: Bergman, 1912.
2. ALEXANDER, F. The relation of structural and instinctual conflicts. *Psychoanal. Quart.*, 1922, 2.
3. ALEXANDER, F., & STAUB, A. The criminal, the judge, the public. A psychological analysis. (Trans. by J. Zilboorg.) New York: Macmillan, 1931. Pp. xx+238.
4. BENDER, L., & SCHILDER, P. Studies in aggressiveness. II. Aggressiveness in children. *Genet. Psychol. Monog.*, 1936, 18, 410-525.
5. KLEIN, M. Psychoanalysis of children. (Trans. by Alix Strachey.) London: Hogarth, 1932. Pp. 8+393.

6. REIK, T. Der unbekannte Mörder. Wien: Internat. Psychoanal. Verlag, 1912.
7. ———. Geständniszwang und Strafbedürfnis. Wien: Internat. Psychoanal. Verlag, 1912.
8. SCHILDER, P., & WECHSLER, D. Attitude of children toward death. *J. Genet. Psychol.*, 1934, 45, 406-451.

II

AGGRESSIVENESS IN CHILDREN

LAURETTA BENDER AND PAUL SCHILDER

Man, a carnivorous animal, must kill in order to live. He is at first compelled to capture an animal, then overpower it if he is to use it for the satisfaction of his needs. In this struggle for life he is forced to defend himself against the aggression of the external world which includes other human beings and animals. In such a pursuit of his needs, he must not only hurt animals but probably human beings as well.

In his relation to plants and the inanimate world, man makes use of his strength. He has to destroy structures and use materials without regard for their inner organization. A close relationship exists between such activities and aggressiveness towards animals and human beings. Thus Freud has proffered the theory that these instincts of the ego, which serve self-preservation, are identical with the destructive tendencies and that they are primarily directed to one's self and only secondarily toward the outward world.

These studies are solely concerned with aggressiveness towards other human beings and are not concerned with the general problems of the relationship between aggressiveness and human activities. Aggressiveness is here considered as violence against other persons, inflicted by physical means and not concerned with mental aggressiveness. We regard violence to be any action which damages the body of another person or distorts the body image of another person by pain or discomfort.

Although psychological and psychoanalytical literature contains many observations concerning the aggressiveness of children, to our knowledge no specific study on the subject, as described above, exists.

Alfred Adler (1) has always stressed the importance of aggressiveness in the fight for superiority. Melanie Klein writes:

The idea of an infant from 6 to 12 months, trying to destroy its mother by every method at the disposal of its sadistic tendencies with its teeth, nails and excreta and with the whole of its body, transformed in imagination into all kinds of dangerous weapons, presents a horrifying not to say an unbelievable picture to our minds . . . But the abundance of force and the multiplicity of the imaginary cruelty which accompany these cravings are displayed before our eyes in early analysis so clearly and forcibly that they leave no room for doubt (10, pp. 177-178).

The destructive impulses in the child culminate in his desire to suck and scoop out the breasts and later to do the same to the insides of the mother's body. Children also have the fantasy of destroying the inside of the body of the mother by poisonous urine and feces. The self-perception of these destructive impulses provokes anxiety in the child by making him fearful of extermination by his own instinctive danger. This anxiety is increased by the external object against whom sadistic feelings are directed. In addition, the combined image of father and mother, but particularly their poisonous excreta, is another source of fear of aggression against himself. Susan Isaacs (8) pictures the child as defenseless against untold dangers. In its super-ego it

suffers from frustration and punishment by the parents. It feels bad since it is full of fear and rage and forbidden wishes.

Hostility is based on general feelings of anxiety and on the sense of possession of power and rivalry. Not to possess what others have is not only a denial of love but an aggression which provokes counter-aggression. Children feel that they should possess whatever they want. Ultimately, they want to possess everything and will defend this attitude with hostility and aggression. The destruction of objects and the injuring of others give the child a sense of power. Aggression is directed towards everybody who receives more attention than the child himself and towards the beloved person who withholds attention. Children are also hostile to each other, as experimental play illustrates. They believe that when they become acquainted with other animals it is well to assume that they are dangerous until proven otherwise. This is the attitude, at least in the beginning of social behavior. Katherine Bridges (4) asserts that fighting, punching, hugging, and touching are exploratory and precede normal social behavior.

Our study is not interested primarily with psychoanalytic interpretation, which Melanie Klein in her books treats rather arbitrarily. We employed a definite method of another sort.

Since it is the general opinion that the degree of physical aggressiveness is a differential characteristic between the two sexes, the investigation included children of both sexes. The cases studied were children under observation in the Bellevue Psychiatric Hospi-

tal. The majority of cases represented behavior problems of more or less severe degree. Some children with borderline defective intelligence were included in the study for the purpose of comparison. The ages of the children ranged from 3 to 15 years. The number of girls examined was 34 and the number of boys, 49. However, the number of girls admitted to the Children's Ward of Bellevue Psychiatric Hospital is always somewhat smaller than the number of boys, the admission rate between girls and boys for several years being 40 to 60.

The following is a list of the children who were included in this study, with the identifying number, the age, intelligence quotient, and a brief statement of the type of problem which the child presented.

<i>Boys</i>	<i>Age in years and months</i>	<i>IQ</i>	
B.1. Joey	3-2	83	Hyperkinetic child from a broken home. Organic factors(?).
B.2. Larry	4-4	92	Behavior problem in reaction to home situation. Unwanted child.
B.3. Milton	5-0	102	Anxiety neurosis, reaction to malignancy in mother.
B.4. Russel	5-4	71	Hyperkinetic. Constitutional inferiority.
B.5. Emmanuel	5-6	103	Neurotic behavior problem, reaction to loss of his home.
B.6. Jack	6-7	56	Post-pertussis encephalitis with convulsions, hyperkinesis.

<i>Boys</i>	<i>Age in years and months</i>	<i>IQ</i>	
B.7. James K.	6-7	85	Psychopathic personality. Deserted child never adjusted to any home.
B.8. Freddie	7-2	98	Inhibited slow child with low basal metabolism.
B.9. Walter	7-2	70	Constitutionally inferior. Hyperkinetic, poorly trained.
B.10. Joseph	7-3	83	Anxiety behavior problem. Reaction to mother's attitude. Unwanted.
B.11. Leon	7-3	80	Conduct disorder, reaction to bad home and reading disability.
B.12. James W.	7-4	93	Aggressive behavior problem. Reaction to broken home.
B.13. Bernard	7-4	91	Aggressive, neurotic behavior problem.
B.14. James W.	7-6	71	Constitutional inferiority with neurotic reaction.
B.15. Will	8-1	92	Hyperkinetic, aggressive, Porto Rican child. Tuberculous suspect.
B.16. Alexander	8-3	83	Schizoid behavior. Motility disturbance. Constitutional deviate.
B.17. Patrick	8-6	98	Psychopathic child. Foundling. Never

<i>Boys</i>	<i>Age in years and months</i>	<i>IQ</i>	
			adjusted to any home.
B.18. James L.	8-8	84	Psychopathic child. Deserted. Never adjusted to any home.
B.19. Edward	8-8	70	Constitutionally inferior. Hyperkinetic. Behavior problem. Unstable family.
B.20. Geo. M. (bro. B.34)	8-9	103	Neglected. Slight organic features.
B.21. Richard	8-11	91	Hyperkinetic behavior problem like encephalitis. Motility disturbance.
B.22. Max	9-4	167	Neurotic reaction of superior child to inferior home.
B.23. Thomas	9-4	97	Behavior problem. Unstable home. Congenital syphilis.
B.24. Marshall	9-6	105	Behavior problem following recent birth of second child.
B.25. Amado	9-6	87	Post-skull fracture behavior disorder.
B.26. Angelo	9-6	107	Hyperkinetic behavior disorder, like encephalitis.
B.27. Ira	9-7	84	Neurotic child from a broken home. Neglected. Vivid fantasies.
B.28. Anthony	9-8	93	Anxiety state associated with family situation. Reading disability.

<i>Boys</i>	<i>Age in years and months</i>	<i>IQ</i>	
B.29. Robert	9-10	86	Illegitimate child. Shifted from place to place. Inferiority feelings.
B.30. Peter	9-11	86	Anxiety state. Family situation. Head injury.
B.31. Morris	10-2	83	Chorea. Fear reaction due to threats of epileptic mother.
B.32. Abraham	10-2	81	Foster home child without attachments. Reading disability.
B.33. John	10-3	75	Inadequate child. Runaway. Reaction against bad home and school difficulties.
B.34. Wm. M. (bro. B.20)	10-4	97	Hyperkinetic. Unstable family. Neglected. Birth injury. Organic signs. Had been in state hospital.
B.35. Charles	11-4	91	Behavior problem, reaction to bad home. Neglected.
B.36. Kenneth	11-4	107	Psychopathic behavior. Reaction to organic inferiority. Congenital myopia and nystagmus.
B.37. Nathan	11-5	83	Schizoid personality. Preoccupied with fantasies.
B.38. Benjamin	11-5	81	Asocial behavior. Undisciplined colored child without a father.

<i>Boys</i>	<i>Age in years and months</i>	<i>IQ</i>	
B.39. John Mc.	11-6	93	Truancy due to reading disability.
B.40. Jacob	11-7	101	Neurotic. Habit tic. Irritable personality. Reaction to rejection by mother.
B.41. George	11-7	94	Aggressive. Unstable. Reaction to psychotic father in home.
B.42. Joseph	11-8	75	Inadequate child with antagonism against brighter sister.
B.43. Edw. J.	11-8	100	Compulsive stealing. Preoccupied with identity due to step-mother who posed as real mother.
B.44. James Mc.	11-8	123	Illegitimate child raised alone by mother. Temper outbursts against mother. Homosexual tendencies.
B.45. Anthony	12-3	105	Compulsive stealing. Reaction to organic inferiority. Congenital defect of genitals.
B.46. John H.	12-0	84	Antagonistic to authority. Organized children in aggression. Colored.
B.47. Leo	13-5	104	Post - encephalitic personality problem.
B.48. Joseph	13-7	51	Constitutional inferiority with hyperkinesis.

<i>Girls</i>	<i>Age in years and months</i>	<i>IQ</i>	
G.17. Irene	10-3	148	Hyperkinesis, like encephalitis.
G.18. Gloria	11-2	68	Sydenham's chorea. Behavior problem in reaction to open conflict between parents.
G.19. Josephine	11-3	90	Severe neuroses with anxiety and features of depersonalization.
G.20. Fannie	11-4	93	Psychopathic child. Raised in institutions, etc. Mother, psychotic. All forms of social maladjustment.
G.21. Bernice	11-5	76	Behavior problem. Adopted child whose foster mother died. No security.
G.22. Ruth	11-6	91	Emotional instability and aggressiveness. Infancy in institution. Ran away from home with stepfather later. Rebelled against boarding homes, etc.
G.23. Helen S.	12-1	74	Hyperkinesis and aggressiveness. Constitutional inferiority. Chorea (?).
G.24. Mildred	13-4	72	Defiant, antagonistic attitude towards authority. Identification with psychopathic father who was rejected from home.

<i>Girls</i>	<i>Age in years and months</i>	<i>IQ</i>	
G.25. Rose	13-7	105	Adolescent antagonism against mother during pregnancy in poverty-stricken home.
G.26. Ernestine	13-7	79	Amnestic episodes following sex experience with syphilitic infection.
G.27. Sarah	14-1	101	Depressive reaction in adolescent rejected from old-world home for defiance to rigid discipline.
G.28. Rose S.	14-3	85	Obsessional cleaning of house in unstable adolescent.
G.29. Fay	14-4	125	Neurotic defensive reaction in response to neurotic mother and bad home.
G.30. Shirley	14-5	60	Paranoid, aggressive behavior in reaction to adolescent problem in constitutionally inferior girl.
G.31. Bella	15-0	68	Primitive reaction to aggressive and sex drives. Defiance at confinement.
G.32. Helen W.	15-1	83	Behavior problem in reaction to organic inferiority. Congenital monoplegia.
G.33. Bertha	15-4	121	Psychopathic reaction type. Blind rebellion against all

<i>Girls</i>	<i>Age in years and months</i>	<i>IQ</i>	
G.34. Helen N.	15-6	83	restriction. Unable to adjust to any home or institution. Mood swings with depression. Reactive to broken home due to psychotic mother.

It should be kept in mind that these children were admitted to the hospital because they had been problems in the community. Many of the children came from poorer sections. Bilingual surroundings were responsible for restricted language facilities in some instances.

It is a matter of course that we did not limit ourselves to verbal tests. Whenever verbal tests were employed, the age of the child and his ability for verbal expression were carefully considered. For these the following questionnaire was used.

1. What is courage (guts, nerve, bravery)?
2. What does it mean to be a coward (yellow)?
3. Why should one not be a coward? Should a boy be a coward?
4. Do you like to hit other children?
5. Is it nice (or right) to hit other children?
6. Would you like to be strong? If yes, why?
7. Would you like to be weak?
8. Should one fight with a stronger boy? girl?
9. Should one fight with a weaker boy? girl?
10. Is it right to hit a girl?
11. Is it right to hit a girl who is stronger?
12. Would you let another smaller boy hit you?
13. Should a boy (girl) holler when he (she) is sick?
14. Is it right to strike back at somebody who hits you?

15. Is it right to hit somebody who insults you?
16. What do you think of sissies?
17. Would you like to be a girl? boy?
- 18*A*. Should a girl fight? Should a girl hit a girl?
- 18*B*. Should a boy fight?
19. Would you like to shoot (kill) somebody?
20. Would you like to kill somebody with an ax?
21. How would you defend yourself against a stronger child?

Especially with younger children, play tests were used in addition. The following three tests were used rather informally, using toys such as one buys at a dime store.

DOLL TEST

Examiner pushes a small doll over by touching head with finger. The same is repeated three times, each time with the question, "What has happened to it?" If child makes no attempt to imitate, he says, "Would you like to play with it?"—then, "Knock it down."

COWBOY SOLDIER TEST

The examiner places a small lead cowboy and an Indian between two soldiers, and says, "What are they doing?" If child answers, "Fighting," etc., the examiner asks, "Why are they doing it?"—then, "Is it right to do it? Can you fight?" etc.

AUTOMOBILE TEST

The examiner places a lead soldier between three toy automobiles, pointing towards the man. "What is this? What will happen? Do you want to play with this? Do you want to play with them?"

The children also had the opportunity to play with a great number and variety of toys. Their behavior was carefully observed. Furthermore, pictures with aggressive contents were shown to children. These were taken from "Flash Gordon," and similar comic strips, and other illustrations from the Sunday magazine section of a New York newspaper. These pictures represented the following.

1. Violent fight with swords, between men of different race and color.
2. A parade of soldiers before going into battle.
3. A hippopotamus throwing a boy out of a canoe.
4. A man holding apples in his hand, with another man approaching in a threatening manner.
5. One boy tackling another, so that both of them fall out of a canoe.
6. Three colored men holding a white man horizontally in the act of throwing him over a cliff into a river.
7. A man with a black eye, on the floor, with two apples near him, while another man with an expression of half-satisfied rage is in the act of leaving.
8. A half-clad woman defending herself with a dagger against a man who is threatening her.
9. A man lying dead on ground, with a shadowy man clad like a bat, leaving the place, which is on fire.
10. A lioness taking a baby from the side of its sleeping mother in a tent, with the father lying near-by, helpless and frightened.
11. More fighting, and two warriors attacking a

third with swords, one of whom has been wounded in the chest by the third party.

12. Three natives leading a white girl on a rope between them.

13. Picture of the martyrdom of St. Sebastian, with several arrows sticking in his body and three men shooting at him.

14. A man taken out of his bed and killed by soldiers, with the swords still in their hands.

The behavior of the children in the ward, and the histories of their behavior at home were carefully studied and compared with the results of the more formal tests.

Our material was separated into two groups. The first one included children from the ages of three to eight years, and the second group, from nine to fifteen years. In the younger group, especially in children below six, the questionnaires could be used only occasionally. The main emphasis had to be put on the play material and on the children's description of pictures. The three- and four-year-old children showed the same characteristics in their play, irrespective of their sex. The following protocol is characteristic of this age group.

Nora (*G.2*, 4 years). "The dog is biting you." She brings the dog near to hand of examiner. A number of toy soldiers are arranged in line formation. She immediately pushes them down, and says, "Down. You got some more?"

Rita (*G.1*, 3 years). This child got particular pleasure out of pushing the toys over. Laughingly, she would say, "Play some more."

Both children very much enjoyed knocking over the toy men. They would say, "I fall that man down. I bite him." Both children would continue their aggressive play by beginning to bite the toys, but finally would bite themselves with great pleasure, and say, "Look." When given a rubber doll, the older child (Nora) started to bite the doll and Rita immediately imitated. This is an instance of immediate forceful imitation.

Nora said to Rita, "It's a bad doll baby. Don't take it." When the smaller child (Rita) started caressing the woman physician, the other child became obviously jealous. She continued to play with the rubber doll and ordered the smaller child not to take it.

After the children had once established the pattern of knocking everything over, they continued even with objects such as cars, and it was only later that the child Rita started to push the car forward and backward.

The description of the pictures by children of this age is very incomplete. The following description by Nora (4 years) is characteristic.

1. That man—laying down—oh look at that man laying down. He is ——. It is a picture—a man—they hurt each other. (*Why do they do that?*) I'm mad on you—I'm going to smack you.

2. We didn't look at that picture. Get some. The man is standing up. It is a dog. (*Knife?*). Yes, they cut somebody. (*Should they cut?*) (*What is that?*) Soldiers. (*What is that?*) A flag. (*What is that?*) A man.

3. (*What is that?*) An aeroplane. (*Rhinoceros*). Man—he is laying down—another man.

One of our youngest hyperkinetic children took the details of the pictures very seriously. Three-year-old Joey (*B.1*) hit the lion and the man in the picture with his fist, since he considered them bad.

In the protocol of Clare (*G.3*), who is about one year older than Joey, the descriptions were still very incomplete. The attitude of these young children towards the pictures was much more objective. There was a tendency to react with a simple moral orientation. The child was primarily interested in whether a person were good or bad. She would say that one of the other figures in the picture was good or bad, without justification, but the child retained a completely objective attitude toward many of the violent acts depicted. When the child was asked why the violent deed had been committed, the answer was frequently, "Because he likes to do it."

Clare M., a girl, 4 years, 11 months. Her history showed that she would feed leaves and dirt to her sister. Clare would pick up the younger sister and drop her with a thud. It was said that she would undress herself, her sister, and her playmates in the open yard; that she broke all her toys and those of her playmates. When scolded, she laughed, screamed, or kicked. Her IQ of 116 was in keeping with her alert behavior. Observation showed her to be an extremely hyperkinetic child, and her mother claimed that she had been so from birth. There was no historical or clinical evidence of encephalitis. She showed no sense of danger with her hyperkinesis. She would jump on the running board of passing cars, etc. She described the picture as follows.

1. Cowboys. They are cutting him up because he is chasing him because he is going to cut him. He has one fellow dead. (*Why?*) He sticks that down into him. (*Why?*) Because he chased him. There is another one chased. (*Who is worse?*) This one. (Points to two yellow men.) Because they are bad. He is chasing him. (*How can you tell they are bad?*) They are bad.

2. He is coming over to these. He will come over and smack them because he is pointing down to these. This is a point. He will stab him, because he is pointing down. (Picks out two of the larger characters and talks about them entirely.)

3. The alligator pushed the boat up and threw the man down in the water. He is going to bite him all up. (*Right?*) Yes.

4. The man is running after him and he has three apples. He is going to smack him right in the face for taking some apples from the store. (*Right?*) Yes.

5. There is two men and a boy and the man went out in the water with gun because alligators are in there. (*Why don't they stay in the boat?*) They want to feel if any alligators is in there.

6. Here is more. This is three mens carrying him. (*What are they going to do with him?*) I don't know. (*Nice?*) Yes, because he is carrying him. They are going to throw him down. (*Right?*) No.

7. Here he is and went over there and threw the apple out of his hand and throw him down on the ground.

8. He is going to take that lady away because he is so bad. She is going to stab him in the eye because he is going to take her away. (*What is he going to do?*) If he stabs her, then he will be deader.

9. That man killed them two men. (*How?*) With a gun. He put it in his pocket. (*Why?*) Because he likes to. (*Why does one man like to kill another person?*) I wish I killed him because he shot him. (*Why is it better to kill this man than that?*) I am going to make that man alive and get him. (*How?*) With something. I would get him dead with a gun. (*Would*

you like to shoot him yourself?) No. I would put something in it then shoot him. (*Where?*) In the back.

10. This man is sleeping and he waked up and the bear is looking at him. He woke up and saw him and then the baby was sleeping and he bite the blanket. (*Why?*) Because.

11. The man is stabbing him because he is going to stab him. (*Why?*) Because he likes to do that.

12. A man with a rope tied in his neck. Here is another one. Then he brings him away. This is a lady. They bring him away. (Points to last man.) They are going to kill him because he was running away on them. (*What is going to happen?*) Nothing.

13. He is talking over there because he is going to shoot him with the barrel. (*Why?*) Because he likes to. (*What is that?*) Stabbed. (*Why?*) He took all his clothes off because he wants to stab him. (*Which would you like to be?*) The one stabbed. (*Why?*) I would never run around there. I would stay in my house. I love to be a man, because a man is better than a lady.

14. Another man hurt. He fell down out of his bed and this man came to try to stab him.

(*What is brave?*) I don't know.

(*What is a coward?*) I don't know.

(*Do you like to hit other kids?*) Yes. (*Why?*) Because. (*Nice?*) No. I like to hit people.

(*Should you hit a kid who is bigger?*) No, because I want to be a little girl.

(*Which would you rather hit, a girl or a boy?*) A boy, because he is bad. (*Aren't girls bad?*) No.

(*Are you bad?*) No.

(*Why are boys bad?*) Because they throw things.

(*What would you do if a small boy hit you?*) I would smack him. (*Small girl?*) I would smack her too. (*One your size?*) Smack him. (*Big one?*) Smack him. (*Suppose he smacked back?*) I would get a piece of wood and throw it on his head. (*Suppose he did that?*) I would run in to my mother.

(*Should you yell when you are hurt?*) No, because I

don't like to. (*Is it right to yell when you are hurt?*) No. (*Why?*) Because. (*When you are sick, should you yell?*) No. (*Why not?*) Because.

(*Is it right to hit somebody who hits you first?*) No. (*Right?*) No. (*Why do you hit them?*) Because I love to hit everybody.

(*Would you rather kill with a gun or an ax?*) Shoot him. (*Why?*) Because he is bad. I like to hit him.

(*Would you rather be a boy than a girl?*) No, I rather be a girl. (*Man or lady?*) A girl. (*Why?*) Because.

(*Is it right to hit somebody who calls you bad names?*) No.

(*What is a sissy?*) A lady. (*Like them?*) No. (*Like to be a girl?*) No. I want to be a boy. (*Why?*) I like to be a boy. I like to smack.

(*Should girls fight?*) No.

(*Should girls smack?*) No. I like to. I like to hear other people cry. I want to smack my little sister.

(*Doesn't it hurt her?*) No. If she smacks me I will smack her back.

(While playing with soldiers) He is going to fall down too. He is going to go in the truck. He is going to shoot him and he is going to shoot the arrow. He is going to turn around so he can't see him and he will shoot him in the back. (*Why?*) Because he likes to. He is going to throw him right down. This car will smack into this one and he will move this car away and go in. This one will back right into the Indian's leg and the Indian will go over it.

He will come up here. If he stands in the sidewalk, he will get run over. The horse is going out in the middle of the gutter. They are all standing there. These are on the bicycle.

It is remarkable how freely the child expresses her tendency to aggression. This girl has already accepted the symbolism that men and boys are aggressive,

and says on one occasion that she wants to be a boy. "I want to be a boy; I like to smack." She is also not averse to killing.

In the protocol of the questionnaire of Milton (B.3, 5 years old) the tendency for simple moral orientation concerning good and bad is again evident. Aggressive tendencies are also uttered with unusual frequency in this later stage. This is the more remarkable since we are dealing with a boy who appears very much frightened and inclined to be passive. His moral connotations are strictly utilitarian; one should not hit because the others would hit back. This child answered to the question "What is a coward?" with the reply, "A cowboy." The verbal understanding of children at this age is limited. A bright eight-year-old girl said that a coward gives milk. It is almost characteristic of children's attitude that they regard the parts of a situation as the total situation. This is demonstrated equally in the verbal description of pictures or in social situations on the ward. In describing picture No. 3, Milton thinks the animal will eat up the man. In the protocols of the younger girls previously mentioned, it is often recorded that they have a tendency to put things in their mouths. It seems that this manifest oral tendency gradually diminishes but still colors the interpretation of pictures at a later age.

Milton, a boy of five, has average intelligence (IQ, 102) and a neurosis of the anxiety type. The mother complained that he was always crying and wanting things he couldn't get. He could not be managed at home. He neither slept nor ate well. Mother stated

his behavior became greatly exaggerated following an amputation of her arm a year ago. This was necessitated by a cancer which developed during her pregnancy with Milton. In addition, she believed it resulted from this pregnancy. This child suffered from an anxiety state as a result of the operation on the mother. His condition improved with ward routine and psychotherapeutic interviews with his physician.

(What does it mean to be brave?) You are big.

(What does it mean to be a coward?) A cowboy.

(What does it mean to be yellow?) They cry.

(Should one be a coward?) I like to be a cowboy.

(Do you like to hit kids?) Then you are bad.

(Why is it bad?) Because they hit you back.

(Is it right to hit other kids?) No, because they hit back.

(Would you like to be strong?) Yes, I like to be a big man. *(Why?)* I like to be one. I would like to have a lot of money.

(Would you like to be weak?) Yes. *(What does it mean?)* O, I don't know.

(Should you hit a stronger kid?) Yes, because he hits me.

(Suppose he is not stronger?) Yes, I would hit him hard.

(Should you hit a smaller kid?) No, they will hit me back. *(Suppose they don't hit you back?)* Jimmy K. is afraid of me. I don't hit Johnny A. because he is my friend. *(Do you hit Jimmy K.?)* No, I don't want the nurse to hit me.

(Is it right to hit a girl?) No, because they hit me back.

(Why is it right to hit a stronger boy?) They hit me. *(Is it all right?)* No.

(Would you let a smaller boy hit you?) No. I would hit him back.

(*Should you holler when you are sick?*) No. You get more sick.

(*Is it all right to hit somebody back?*) No. I would call the nurse.

(*Is it right to hit somebody who calls you bad names?*) No, because they hit me back.

(*What is a sissy?*) A girl.

(*Do you like to be a sissy?*) Yes. (*Why?*) I like one. (*Why?*) Because I like to wear lipstick. (*Why?*) Because I like to be a girl. I like to play with little girls. (*Why?*) . . .

(*Should girls fight?*) No, they will hit me back.

(*Would you like to shoot somebody?*) Yes. (*Who?*) Jimmy K. (*Why?*) Because. (*What would happen?*) He would be dead.

(*Would you like to make him dead with an ax?*) Yes.

(*Which would you rather have?*) A gun. I would like to have a real gun. The gun is better because then you get a bad man to shoot them.

(*Is it right to hit other people?*) No, because they will hit you back.

(*Should boys ever fight?*) No. (*Why?*) Because they will hit you back.

He described the pictures as follows.

1. They are fighting—with a knife. They are stabbing one standing over him with a knife. I'd like to bust him—I'd like to stab him. (*Nice?*) Yes, because he is bad.

2. All these people are marching and all these are marching. This one has a knife. This one stabs these ones and these ones stab these ones. Because they are bad.

3. This is the boy that's ashamed. He is a crocodile. He will eat him up. He is afraid of the crocodile, because he will eat him. Because he is bad. If he goes in the water he will drown.

4. Here is a man. He doesn't know he is looking behind him. He is bad. This is a boy (with apples). He stole these apples and his father will hit him.

5. Here is two men. This one is going to fall. They are going to fall in the river. I don't know why.

6. Here is a girl. They are going to throw her in the fire. She is bad. No, I mean she is sick. She has been in this house. (*Is it mean?*) I don't know. (*What is she doing?*) She was sleeping. These people come and take her away.

7. This man here gave this boy a black eye. He saw stars. This one walks home and this one threw his apples away.

8. This girl is going to stab him but not this one because this one wants to stab. They are going to stab her.

9. All these men are dead. He shot him or killed him. The Blue Eagle shot him. He was bad. This was her house — the Blue Eagles. He shouldn't go in there — he should have gone in the right house.

10. The lion comes and eats the baby up — then the father wakes. The mother don't know it.

11. Those men are stabbing other men. (*Nice?*) No. I'd like to be a man like all these people. It would be nice to stab everybody if they stab everybody.

12. This Indian is not dead. This man and this man are tied and this girl. This Indian is going to stab her — no, she got lost and these Indians are going to take her down.

13. All these Indians are going to stab him — because he got bad. He is a bad man. He went in all those houses and went out again.

14. Here is a girl that is dead and all the men come. Here is one soldier came in. Then they will make him better. She is dead.

James W. was a seven-year-old white boy of Catholic parentage. His intelligence averaged 93. He was brought to the clinic by his mother because of stealing, setting fires, misbehaving in school, fighting with other children, and disobedience. Psychological tests revealed that he had a reading disability and was color-

blind. He (B.12) was an extremely aggressive child who freely expressed this quality both verbally and in play. It was also revealed that he, too, showed the tendency for a simple moral orientation into good and bad with the toys, by creating hostile groups such as Indians and cowboys. In his play he was paired with Dorothy, who, though actually older, had approximately the same mental age. She was not an aggressive child in the usual sense but showed aggressive tendencies in order to bring punishment upon herself. She was aggressive when the formal character of the toys would naturally give a pretext for this type of play.

(Why bring you here?) Because I am crazy for fighting. As soon as my mother gets a house she is going to take me home. She is going to be dispossessed. Sometimes you are put out in the street. I know one woman downstairs from where we live got put out on the street. Because you don't pay your rent. Because we didn't have no money.

(Why fight?) Because I like it. You have a lot of fights and you have a black eye. Once they get me going, then it's too bad. Then there's black eyes, two or three, not one. Once they get me going — I like it more than anything. *(Like to get hit yourself?)* I like to get hit from my mama when I am bad. *(Bad purposely so you will get hit?)* Yes. *(What do?)* Run out in the street and when my mother calls me up I come up and get a whipping. I could be hit with an iron and I could never cry. *(Fight big or small boys?)* Bigger ones because it's better. The small ones can't fight and the big ones can. I jump at their feet. Next thing, I like to get hit. The big boys can fight with me and I can be tripped.

(Always like to be hit?) Yes. *(Like to get black eyes?)* Yes. *(Only fight to get hurt?)* Yes. *(Ever have two black eyes?)* One. I would like to have two.

He stated that he liked being hit and punched in the stomach but not to the extent of being knocked out or made black and blue. To be pinched or see blood come was not liked by him. He said his mother whips him "in the can."

(*Fires?*) I am crazy for fires. You can cook mickies (potatoes). The lot was on fire. (*Did you light it?*) No. Some woman said I did it. The night before I came here I stayed out so late until I got off every gate and rang their bells. Then I run. We put the gates back loose how they were and when the people come out they open the gate and the gate comes off. (*Fun?*) Sure. (*Fun to start fires?*) No. Sure, in case they said I could, it's fun. (*How many have you lit?*) Ten. I had an ax so I chopped some trees. It's really my father's. Then I chopped it in little pieces and brought it in the lots and lit it. We put mickies in it and when we went away put it out. (*When?*) Saturday. (*How did the one start on Sunday?*) A big boy. He had a pack of matches. One didn't light, the other one lit and then he smoked. (*You?*) One. I lit that one and it didn't light, then I went looking for some more and lit them and then I lit the fire. What the heck day was it? I got a little mixed up.

(*Swearing?*) Since my father went away I don't do that no more. He used to swear at me and I would curse right after him. I thought it was fun. The State Hospital came out after him. He got gassed from the war.

(*Lose temper?*) Yes, My mother can't move. I get my feet tight around her and sock her and yell at her top of my voice. It's more fun than anything. Then you have rags and wipe up the floor. (*Why?*) From the sink water — I turn it on.

(*Dillinger?*) I think he is the same as me. I am glad I ain't big. I'm afraid I might be Dillinger. I would be in jail. He is in jail. He is going to the electric

chair. (*Think he should be?*) Yes. He held up a lot of people. (*Fun?*) No. It's too much gangster business. You have to shoot people. (*Right to kill?*) No.

(*What going to be?*) An aeroplane detective. They have guns to shoot people, gangsters. (*Like to go to war?*) Sure.

With toy figures, the boy again expressed aggressiveness unrestrainedly. The figure with a knife is a "bad guy." Indians are also "bad." "They shoot arrows."

On the ward, he made a good adjustment at all times and was well liked. Behavior difficulties occurred only occasionally. He was cleverer than other children in covering up his behavior and would usually show good behavior when under supervision.

Dorothy (G.10) was a girl of nine with a mental age of six years, eight months, with an IQ of 75. She also had a special reading, writing, and spelling disability and was left-handed. She was a disturbing element in class because she always interfered with the activities of other children and yet had little ability to play with other children. The following is given as a typical performance. She was given pictures to paste. Instead of proceeding with the task, she left her seat, ran around the room, knocked down charts, became angry at herself, scratched her arm, shrieked, tore up papers, and kicked whatever was near her. She then picked up a pair of scissors which had to be taken from her by force. On another occasion she threw papers, tore papers belonging to another pupil, and threatened to punch her in the back. She threw everything within reach to the floor, such as pencils, paper, scissors, etc. When she picked up other pencils and scissors, she

buried the scissors in the sand and put the pencils down a hole in an iron drain in the floor. She then tore up more papers, banged herself with her fists, scratched her arms.

In an interview, she was timid and shy; she spoke in a low, inaudible voice; she appeared disinterested, and walked away during questioning.

(Why in hospital?) Because I fight myself. *(Scratch yourself?)* Yes. *(Don't you like yourself?)* Yes. *(Nice girl?)* No. I fight, I get bad. The teacher tells me to sit down, then I fight. *(Brother and sister?)* Yes, I fight the little one, Barbara. Because I want to. *(Don't you like her?)* Yes. *(Then why fight her?)* Because I want to. I push her down. Then she cries. *(Fun?)* No. *(Why do it?)* I don't know. *(Hit others in school?)* Yes. They bother me. They scratch me. *(Who made that scratch?)* A girl. *(You said you did it?)* I did. *(Then why hit girl?)* I don't know.

(Do you like your teacher?) Yes. *(What do you do?)* I sew and write. *(Make teacher mad?)* Yes. I fight with her. I don't fight with the teacher. I put my feet up on the table when she goes out of the room. *(Like to make her mad?)* No.

(Toy figures.)

Soldier; no, a cowboy. Indian. The cowboy is going to shoot the Indian. *(Right?)* No. The soldier is going to shoot him (peasant). The Indian is going to shoot him. *(All right?)* No. *(Who is best?)* This one (peasant). That man (in car) is running over that one (horse and rider). He won't get out of the way. The horse will get mashed. The man will get mashed too. You get killed. *(Nice?)* No. You are buried. You get some flowers. *(Nice?)* Yes. They put them over the coffin.

(Afraid of something at home?) My father. He hits me because I talk back to him. My mother don't like

him. (*Like it here?*) Yes. Better. I get pretty books. (*How often get hit?*) A lot. Because I hit them. (*Who starts?*) My sister. (*Should you hit?*) No. (*Should you be hit?*) No. (*Most scared of?*) My father. He took all the clothes and my mother told him to get out. He is too mean. I like him now. He brings me fruit. (*Ever hurt mother?*) Yes, he fought my mother. He threw her in bed. He shakes the bed. (*Where do you sleep?*) In the next room. She screamed. She said bad words. I wouldn't say them. (*Mother bad?*) No.

A social investigation revealed that the mother was subject to severe temper outbursts that terrorized the children and that the father also at times showed temper outbursts, especially when he was drunk. His outbursts were probably secondary to those of the mother.

(Soldiers arranged before Dorothy and James so that pirate and soldier are shooting and stabbing an unarmed man.)

Dorothy:

This one is shooting this one. This one stabs him.

(*Why?*) I don't know. (Brings unarmed man closer to pirate.) This man (pirate) is going to stab this one (unarmed man).

(Two soldiers shooting two Indians.)

James:

They are shooting each other. Indians don't like soldiers and soldiers don't like Indians. (*Why shoot?*) I don't know.

Dorothy:

(*Think he should shoot?*) No. (*Why not?*).

James:

(*What do you think?*) That guy (soldier) is good and this guy (pirate) is a bad guy. He got a knife. (*Don't you think it's also wrong to have a gun?*) A knife you can throw and a gun you can shoot. (*Better*

to have knife or gun?) Gun. Because the bullet goes farther than a knife. (*Why is this man bad and this one good?*) Because he has a gun.

In discussion, James used the word "good" in two different ways; once he used it in a moral sense and once to describe a more effective weapon of aggression. He apparently felt the aggressivity of the dagger more than the aggressivity of the rifle, and felt that the hand-to-hand fight was more cruel than the one with bullets.

(*Why is he better?*) Because a bullet can go farther than a knife. (*Which is bad guy?*) This one. He has a knife and this one has a gun. A knife is bad and a bullet comes out of you. A bullet you got a little hope, but if you are stabbed you are dead.

Dorothy:

(Grab one of the toys.) I don't want it to be stabbed.

James:

(Two Indians shooting at each other.) Two are fighting. (*Would you like to be with them?*) Sure. Because Indians are Indians. They fight much better with bow and arrows. (*Like to be there?*) I would. I would like to see how far the arrows go from the knife. (Indians shooting cowboy with gun.) It's two men against one man. (*Fair?*) No. If you put one out then it would be fair. (*Fair now?*) Yes. (*Like to be in such a fight?*) No. (*Why?*) Because it ain't right.

Dorothy:

(*Would you like it?*) No. (*Why not?*) Because you get in trouble.

James:

(*Like to shoot anybody?*) Shoot Indians, yes. (*Why?*) Because Indians are bad. They shoot arrows.

Dorothy:

(*Would you like to kill somebody?*) No. (*Like to shoot an Indian?*) Yes. They are bad.

(Takes cowboys from in front of Indians.) I took

them away. I don't want them to get hurt. (*Would you like to be very strong?*) Yes — so I could fight. (*Want to fight?*) These (toys) — hit them, scratch them. Then they would shoot me. (With angelic expression on her face.)

(Both children are continually changing the order of the toys. Dorothy finally puts them together and says: "I am going to put them away. I want to play with the doll.")

James:

(*Would you like to be strong?*) Yes. So I can fight. (*Like to hit other children?*) No. (*Why not?*) I don't know. (*You really like to, don't you?*) Not so much.

(*What would you do if a stronger boy hit you?*) Fight back. (*Smaller boy?*) Just let him. (*If he hurts you?*) Just let him. (*Right to hit a girl?*) No.

Dorothy:

(*Like to hit somebody?*) No. (*Why not?*) They would hit me back. (In the girl there was the continual fear of retaliation if she became aggressive. She was always trying to hide and take away one of the tin soldiers.)

(Man surrounded by three cars. Dorothy started rolling a car. James ran a man down with a car and put him into another car.)

James:

(*What did you do?*) I knocked him down. He was run over. The guy was carrying him. (*Why stand him up like that?*) He will be run over again.

Dorothy:

The car will run over him and he will be dead. (*Bad to be dead?*) No. (*Good?*) No. (*Like to be?*) No.

James:

(*Would you?*) No. It's bad. When God comes he wakes you up. (*For what?*) To take you to Heaven. (*What is Heaven?*) I don't know. It's better to go to Heaven than anything when you die.

Dorothy:

(Kisses car.) (*Why?*) Because it's little. (Puts it in another car.) I don't want it to get knocked over.

It appeared as though there were a pattern of aggressivity which had to be followed. The objects implied a tendency that expresses motor activity in connection with momentum. Momentum leads immediately to aggression.

James:

(Puts two men in truck. Says he puts them in so the other car will not run over them.) (*Should girl be strong?*) No. (*Why not?*) I don't know. (*Should man?*) Yes. (*What are you doing?*) I am making a war.

Dorothy:

(*Should one hit other people?*) No. (*Why not?*) You get hit back.

James:

(*Should one?*) No. It ain't right. When you do that you go to jail. (*Suppose you get away with it?*) Anyhow I wouldn't do it. One day they will find you. (He showed a marked tendency to play with things on the edge of the table.)

The eight-year-old Will still showed the utilitarian concept of morality. He showed clearly that he had accepted, without criticism, the morals which adults had imposed upon him. He did not want to fight with smaller boys and said that one should fight only with bad boys of the same size. He expressed contempt for "sissies" which he defined in the usual way as a boy who goes with girls. Contrary to the average boy, he was not quite sure that it might not be better to be a girl because "nobody touches them." But he also said that he didn't want to be a girl because

"girls have to stand too much on their feet when they walk." These statements show that children of this age tend to see the different sides of a problem according to the situation and do not tend to come to definite opinions.

Will (B.15) was a boy of eight with low average intelligence, who was brought to the hospital by his parents because of his runaway tendencies and general defiance of authority. For a couple of years he had been considered an incipient case of tuberculosis. His mother said, "He stays out until three o'clock in the morning on the street. I have had to call the police two or three times to find him. He takes so many things that I can't keep up with him. He took a knife and tried to kill me. He tried to jump out of the window. This child's response to our questions was as follows:

(*Who would you like to be?*) Casper (the hero of our puppet shows). I would hit everyone because they are bad and I would fight when they are having war. (*Like to fight in war?*) Yes. To save the poor people.

(*What did you do with a knife?*) Nothing. My cousin got it from some place. I said, "Where did you get that knife?" and she didn't tell me.

(*What did you steal?*) Balloons. There is a boy in my house—he steals and he hits. (*Is he a good boy?*) Yes.

(*What is brave?*) I don't know. (*What is courage?*) . . . (*What is a brave man?*) When you are brave you don't let nobody do nothing to you.

(*What is a coward?*) I don't know. (*Yellow?*) It means you are afraid. They are going to shoot your friends. When you are afraid that they will shoot you, you call your friends.

(*Why shouldn't you be yellow?*) Because nobody will kill the one that is yellow.

(*Do you like to hit other kids?*) When we fight. (*Why?*) If their mother tells them something, the mother should hit them. (*Do you like to hit other kids?*) The ones that are bad.

(*Would you like to be strong?*) Yes, because then you will grow up big; then you will be strong. The ones that are strong they will be strong when they are big. I want to be strong so I can fight when I have a war.

(*Would you like to be weak?*) No, because they shoot you. (*What does weak mean?*) When you can't stand up and they bring them to the hospital.

(*Should you fight with a strong boy?*) If you are not strong, you can't fight because they will take you and grab you.

(*Should you fight with a weaker boy?*) I would take them to the hospital after I fight with them.

(*Should you fight with a smaller boy?*) No, big boys. I would grab a big boy. (*Suppose he is bigger?*) I would grab him. (*Suppose he hurts you?*) He won't hurt me if I have my clothes on.

(*Should you fight a little boy?*) No, because they are little and they don't know.

(*Should you fight with a boy just your size?*) If they are bad.

(*Is it right to fight with girls?*) No, because girls are important. (*What for?*) Nobody must fight with the girls because they are not allowed to. (*Why?*) Because they put them in jail.

(*Should you fight with a strong boy?*) If you are not strong, you won't fight because they will take you and grab you.

(*Should you fight with a weaker boy?*) I would take them to the hospital if I fight them.

(*Is it right to hit a girl if she is stronger?*) Yes. (*Why?*) Because they are too big and they can win.

(*Would you let a small boy hit you?*) Yes.

(*Should you holler when you are sick?*) No, because you must not be. (*Why?*) Because they get more sick.

(*Is it right to hit somebody back if they hit you first?*) . . . (*Little ones?*) No. (*Big ones?*) Yes.

(*Is it right to hit somebody if they call you names?*) Only big ones. If it is a lady it is O. K. (*Suppose they are just a little bit bigger?*) I would hit them too. If they are bad, I would hit them.

(What is a sissy?) When they go with the girls. It means that you go with the girls. If a boy goes with the girls, they call him a sissy. They are not allowed to go with girls because the teacher hits them.

(Would you like to be a sissy?) No, because I am a boy.

(Would you like to be a girl?) No. If a girl hits you, you have to stand it. Girls have to stand too much on their feet when they walk.

(Why don't you want to be a girl?) I would like to be a girl. *(Why?)* Because nobody touches them. Girls can go to war, too. I saw girls in the war with the cowboys. The girl shoots.

(Would you like to be a woman when you grow up?) Yes. Nobody touches the girl. They hit me.

(Is it right to shoot somebody?) If they shoot.

(Would you rather shoot or kill with an ax?) Shoot them. If somebody shot me, I would shoot them. I would rather kill with a gun. Unless they shoot I wouldn't shoot them back. *(Suppose they had an ax?)* If I had one, I would throw it on them.

(When is it right to hit somebody else?) When they are bad. *(How?)* When I do something bad. When you holler at your mother and you don't listen to your mother.

(What would you do if a strong boy was after you?) I would give him a blow on the nose.

(Should girls fight each other?) No. They are not ladies. Your mother hits you.

(Should a girl hit a boy?) Yes, because they are boys.

(Should a girl yell when she is sick?) No, because she will get more sick.

(Is it all right for boys to fight?) Yes, because they are boys.

(Should a boy be yellow?) No. *(Why?)* They must not be yellow because their father hits them when they are yellow.

(Should girls be strong?) Yes. When they want to have a war, then they should be strong to fight.

A. DISCUSSION OF RESPONSES OF CHILDREN BETWEEN THREE AND EIGHT YEARS

Thirty children of this age group were included in the study, but only 13 (five girls and eight boys) responded to the questionnaire, and in some of these cases only in part.

Question No. 1. What is courage? What does it mean to be brave? Although children up to the eighth year generally do not understand exactly the meaning of the word courage, their answers often show that they react to the term in a general way. Some of the answers are:

G.3.¹ I don't know.

G.4. When you are sorry (corrects herself, "strong").

G.6. I don't know.

G.7. Somebody who fights.

B.3. You are big.

B.15. You don't let nobody do nothing to you.

B.16. You holler because you are mad. (Brave.) Kind.

B.18. It means you grow up.

B.20. You can take it—you are strong—you don't cry or anything.

B.21. It means if you want to go through a battle you have to be brave—he is afraid they can kill him and he is brave.

Children of this age do not get more than a vague idea of these abstract concepts.

Question No. 2. What is a coward (yellow)?

G.3. I don't know.

G.7. When you fight.

G.4 and G.6. A cow.

G.8. Gives milk.

¹G.3., B.3., etc., designate subjects (see pp. 418, 413).

- B.3. A cowboy. (Yellow.) They cry.
B.15. It means you are afraid.
B.16. Bad, very bad; you holler at everybody and everything.
B.17. He don't do a thing; he walks around all day like Robert R.
B.20. You are afraid to hit anybody.
B.21. If a boy is fighting he takes a rock and throws it.

Question No. 3. Why shouldn't one be a coward?

- G.4. I don't want to be a coward.
G.6. It means one should not be; it means they are fresh.

B.3. I like to be a cowboy.
B.15. Nobody will kill the one that is yellow.
B.16. Nobody will like you.
B.21. Because he is called a coward.

Question No. 4. Do you like to hit other children?

- G.3. Yes, because I like to hit people.
G.4. No, some are good.
G.6. No, because they will hit me.

B.3. Then you are bad because they hit you back.
B.15. The ones that fight are bad.
B.16. No, I'm afraid of their mothers and fathers and brothers and sisters. They will tell them and they will hit me and make me cry.
B.17. Yes, if they are bad.
B.18. No, maybe the other kid don't want to fight.
B.20. If anybody hits me first, I hit them back.
B.21. No, I don't want to get in trouble; they will get you some day; kids never forget.

Children consider this problem from a practical point of view. They are afraid and try to avoid the consequences. Their connotation of bad and good is purely practical and facilitates their orientation in a dangerous world.

Question No. 5. Is it nice (right) to hit other children?

G.6. No, you can hit them if they hit you.

B.3. No, because they hit you back.

B.16. No, I will get in trouble.

B.17. If they are bad.

B.18. No, unless they are bad or say curses or hit you.

B.21. No. If you hit a kid, he will get you some day.

Kids never forget.

Children at this age level do not differentiate between what they like to do and what is right to do. They generally do not care to profess that they like to do something which is not right, with the exception of the earliest age levels (before five years).

Question No. 6. Would you like to be strong? If yes, why?

G.6. Yes, because you grow up.

G.7. You are strong enough.

G.8. Yes, because you get nice and healthy.

B.3. Yes, I like to be big and have lots of money.

B.15. Yes, I like to be healthy.

B.16. Yes, to be a strong man when you are big and fight in the war.

B.17. Yes, you can fight.

B.18. Yes. (*Why?*) I don't know what it means.

B.20. Like I am; yes.

B.21. Yes, you can pick up heavy loads of rocks.

Children do not differentiate between the connotations of strength and health. They use these connotations more or less indiscriminately. The terms are the expression of a general attitude of either acceptance or refusal.

Question No. 7. Would you like to be weak? Why?

- G.4. Because I can't slap anybody.
G.6. No, because you fall over yourself.
- B.15. No, because they shoot you and you can't stand up
and they bring you to the hospital.
B.16. No, I like to be strong.
B.18. No, I don't want to be.
B.20. No, if anybody hits you, you lose.
B.21. No, you can't pick up stones or run so fast.

Question No. 8. Should one fight with a stronger boy? Or a stronger girl?

- G.3. No, because I want to be a little girl.
G.4. No, I don't play with big boys, but I can hit Helen
(G.14).
G.6. No, they could hit you.
G.8. No, she will hit back.
G.9. No, because you might get hurt.
- B.3. Yes, because he hits me.
B.15. If you are not strong you will not fight because they
will take you and grab you.
B.16. No, bigger kids will hit me and make me cry.
B.18. No, I wouldn't want to fight.
B.20. Yes, if they hit me.
B.21. He might knock you out.

Question No. 9. Should one fight with a weaker boy? Or a weaker girl?

- G.3. Yes, because I like to.
G.4. No, because I won't fight with anybody smaller
than me.
G.6. No, because they could fall.
- B.3. Not Johnnie A., he is my friend, but I would like
to hit Jimmie K. but the nurses would hit me.
B.15. I would take the weak ones to the hospital. I
would only fight with big boys; the little ones don't
know how to fight.
B.16. No, because they are little.

B.17. No, the strong ones could knock him out and break his bones.

B.18. No because you get locked in a room.

B.21. You might make him sick or make him die.

Children lead you to understand they think it is all right for them to fight with someone of equal strength, but they are afraid of the direct consequences of fighting with stronger children, and of the indirect consequences of fighting with weaker ones (punishment by adults). The uncertainty and vagueness of children's connotations play a particular rôle in this question, since weakness is almost invariably connected with the connotation of disease. Also, the term "stronger" does not mean only "stronger" but also "bigger" and "older." In the world of the child, children one or two years older are beings of another order and have some of the dangerous qualities of the adult. In the child's there is always the fear of being overpowered.

Question No. 10. Is it right for a boy to hit a girl?

G.4. No; a girl shouldn't play with boys—then they won't hit them.

G.6. No, because they are rough.

B.3. No, because they hit me back.

B.15. No, they are important; you are not allowed to; you can go to jail.

B.16. No, because she is a girl and I am a boy.

B.17. No, you would be a sissy.

B.18. No, because you get caught.

B.21. No, because a girl has respects; she doesn't know how to fight—you get into trouble.

It is a generally accepted attitude for girls as well as boys that boys should not fight girls.

Question No. 11. Is it right to hit a girl who is stronger? (For boys only.)

B.3. No, because they will hit me back.

B.15. Yes, they are big and can win.

B.16. Yes, because she is bigger. (*If your size?*) No.

B.17. No, she will knock the boy out. (*If the same size?*) Yes.

B.18. No, she is too big. (*If your size?*) Never fight girls—only boys.

B.21. They hit you back.

Seemingly, the difference in sex is less an obstacle in fighting than the relative size or strength of the child in question.

Question No. 12. Would you let a smaller child hit you?

G.3. No, I'd smack him back.

G.4. Hit her back and tell her mother.

G.6. No, I would hit them.

G.7. Yes, because she is small.

B.3. No, I would hit him back.

B.15. Yes.

B.16. I would give him a punch in the belly because he started up.

B.17. I would knock the day-lights out of him. I wouldn't let him hit me.

B.18. No, when they hit them, they hit them back.

B.20. Yes, I wouldn't do anything—I would just walk away.

B.21. Tell his mother or nurse.

There is, however, some tendency to spare the smaller child, even when it is aggressive.

Question No. 13. Should you holler when you are sick?

All children answer this question by saying that one should not holler when one is sick, otherwise one will

get worse. *G.8* said, "I never had pain," showing that children are strictly bound to the concrete situation in which they live.

Question No. 14. Is it right to strike back at someone who hits you?

G.3. No, but I like to.

G.6 and G.7. Yes.

G.8. No, you should run away.

B.3. No, call a nurse.

B.15. Little ones, no—big ones, yes.

B.16. and B.21. Yes.

B.17. If I touch something of his he has a right; if he has no right, I hit him back.

B.18. No.

B.21. Of course it is right.

Although the utilitarian view is prevailing, one answer stresses the idea of right and wrong directly, and another indirectly.

Question No. 15. Is it right to hit somebody who insults you?

G.3. No.

G.4. Yes, because they call me bad names.

G.7. No, I call them back.

B.3. No, because they hit me back.

B.15. Only big ones; if they are bad I hit them.

B.16. Yes, because he called me names.

B.18. Yes, because they curse. (*Is it worse than hitting?*)
Yes.

B.20. Yes, if they are smaller, I would; if they are older, I wouldn't.

B.21. No, if I hit him he might get me in trouble.

Cursing is often considered a much more serious offense than hitting.

Question No. 17. What is a sissy and what do you think of a sissy?

- G.3. A lady. I don't like them.
- G.4. When you are bad; when you go with the boys.
- G.6. A boy who plays with girls.
- G.7. A sissy is a girl.
- G.8. A boy—I don't like them.

- B.3. A girl—I like them.
- B.15. If a boy goes with girls, it is not allowed. The teacher hits them.
- B.16. Pussy cat. I like cats. (*Is a boy ever a sissy?*) If the boy is like a cat. (Later on.) A boy that fights girls. I don't like them.
- B.17. Someone who hangs around with girls and don't like boys—I don't like them.
- B.18. A girl; I don't like them.
- B.20. I wouldn't play with them; I wouldn't want to be one.
- B.21. A boy that plays with girls; and other boys that play with sissies; I don't like them.

It is advisable to discuss this question together with the next one.

Question No. 18. To girls: Would you like to be a boy? To boys: Would you like to be a girl?

- G.3. I like to be a boy because I like to smack.
- G.4. No, because the boys go around with girls.
- G.6. No, because I don't like to be rough.
- G.7. Better to be a girl—I don't know why.
- G.8. I don't like to be a boy.

- B.3. Yes, I like to wear lipstick.
- B.15. Yes, because nobody can touch them. They can go to war, too. I saw a picture of it.
- B.16. No, boys have more fun.
- B.17. Boys have more toys and wear pants. You can pick up a girl's dress any day, but if a girl wants a boy's pants off she couldn't do it.

B.18. No, it better on the boys' side with M. D. (popular boys' nurse).

B.20. I wouldn't like to be a girl because I like to be a boy.

B.21. No, because a girl is weak.

It is remarkable that only the younger and physically small children accept the idea of a change in sex rather readily. Seemingly, the difference between boy and girl does not mean very much to them. They see only the superficial characteristics. However, the fact that there is some deeper meaning in these utterances becomes evident from a study of the case history of B.3, in which passive and masochistic elements are outstanding. The paucity of questionnaire material in younger children is partially balanced by the study of play material in which similar responses were obtained. One gets evidences, in any case, of pride in masculinity and femininity which increases with age and which is at least partially due to social influences.

Question No. 18A. Should a girl fight? Should a girl hit a girl?

G.3. No, but I like to. I like to smack my little sister; I like to hear her cry.

G.6. No.

G.7. No.

G.8. No, because it isn't nice to fight and hit.

G.9. No, because you get hurt and a cop may chase you.

B.3. No, they will hit me back.

B.15. No, they are not ladies.

B.16. No, it is not nice.

B.17. Sure, if they want to.

B.18. No, never. (*If a boy hits her?*) She should sock him back.

B.20. Yes. If another girl socks her she should sock her back.

- B.21. No, they are weak. If you touch them back they get mad. (*Should she hit a girl?*) No, she might get in trouble.

Question No. 18B. Should a boy fight?

G.7. No.

G.8. No.

B.3. No, because they will hit you back.

B.15. Yes, because they are boys.

B.16. No, both will be sissies.

B.18. No, unless the other one hits him first.

B.21. No, he might get in trouble and have to stay in a room.

It is seemingly the general opinion that girls should fight less than boys.

Question No. 19. Would you like to shoot somebody?

G.3. Yes, because he is bad I like to hit him.

G.4. Yes, my real daddy.

G.6. No. (*Gangsters?*) Yes, because they shoot me.

G.7. No.

G.8. and G.9. Yes, if somebody is bad.

B.3. Yes, Jimmie K.

B.15. Yes, if they shoot me.

B.16. Yes, a girl. (*Why?*) I don't know. (Boy's mother was shot.)

B.17. I would love to for hitting people too much.

B.18. No. (*Gangsters?*) Yes, because they want to shoot the man on the other side.

B.20. If it was a gangster I would.

B.21. No. (*Gangsters?*) If there is a war you could kill him. (*Would you like to?*) No, they might blame me.

Comments are reserved to include responses from Question No. 20.

Question No. 20. Would you like to kill somebody with an ax?

G.3. I like to shoot him or hit him.

G.4. No, the gun kills you really.

G.6. The gun is better because it has bullets.

G.7. No.

B.3. Yes, Jimmie K.

B.15. If somebody shoots me, I'd rather shoot them but if I only had an ax I would throw it at them.

B.16. I'd rather have a gun.

B.17. No, I like to chop wood but not people. You would be in jail, but if you shoot them they can't catch you.

B.18. Yes, because they threw it on your back and kill you that way.

B.21. No, I would rather shoot with a gun. It has bullets and an ax takes too long.

Even small children who show their aggressiveness so clearly in play do not freely profess their murderous wishes unless there is a specific reason, such as in G.4, when the child is rather sure of the approval of adults. The aggressiveness against the father in this girl has been stimulated by the mother who is divorced from the father and has taught the child (she has never seen the father) to express herself in this way. In other cases the children say that it is all right to kill gangsters. The preference for the gun as an instrument of killing is already present at these early ages. This is due in part to the recognition of the greater effectiveness of this weapon and in part to the recognition of the danger and unpleasantness from direct physical violence. Although these motives are present in the smaller children, they find a much clearer expression in the older ones.

Question No. 21. How would you defend yourself against a stronger child?

G.3. I would get a piece of wood and throw it on his head.

G.7. I'd hit him back.

B.15. I would give him a bloody nose.

B.16. Hit them back just the same.

B.17. I would run.

B.18. Hit them back or tell a nurse.

B.21. I would hide somewhere.

The tendency to reactive aggression is obvious in these answers. Piaget, quoting Mlle. Rambert, says that aggression in reciprocity is justified in the minds of children (14). A smaller child must either hit back himself or get someone stronger to hit back for him. Revenge by some other method, such as hiding possessions of the stronger child, is not accepted as morally correct.

B. AGGRESSIVE PLAY OF CHILDREN

One cannot evaluate the answers to the questionnaire correctly if one does not consider the play of these children as well as their spontaneous behavior. The three-, four-, and five-year-old children show a distinct aggressiveness in playing with toys and in their tendency to knock them over and throw them from the table. The falling down of a toy is often a sign of death to them. In an analysis of an adult by one of us (*P.S.*), one of the earliest remembrances was about a servant maid, stumbling and falling, whereupon the child exclaimed, "Julie dead." Schilder and Wechsler (15) have shown that

for children death means death by violence. The upright posture and the relation to gravity is not only fundamental from the physiological but also from the psychological point of view. In the early play activity children are also very anxious that the toys should remain upright. The protocol shown above on Nora and Rita clearly reveals the primitive features in the organization of play and aggressiveness. Frequently, the single doll is pushed over or the car is thrown away without any deeper relation to its function. Our observation on the three-year-old Joey shows the formal features in his play. He first placed the soldiers in a row; then he put them near the border of the table; next he put a cluster of three men around a horse, and so on. This is mentioned merely to show that there are principles of organization, but they do not follow the concepts of the adult and thus lend themselves very easily to an aggressiveness directed against very simple units. The tendency to bring the object to the mouth is present only in the very young children. When the children are older, the organization often is much closer to the pattern of adults. The soldiers are put into rows and groups and placed along the borders of the table, or are otherwise arranged to recognize the background or field. Opposing groups are formed by placing those of different categories in different positions. The car knocks over a man. The wounded or the dead are carried away in a car. The character of the object becomes important for the type of aggressiveness expressed. The tendency for moral orientation comes out very clearly. The Indians are often

"bad men," or the pirate is "bad," and it is quite justified for the others to shoot the "bad men." Jimmie K. (6.7 years) called Indians and pirates "bad men" and soldiers "good men." He would let the Indians kill the soldiers and pirates, and then he changed the situation and said, "The Indian is running away because he is going to get killed by him (pirate)." He then laid all the toys down and said, "Look, they are all dead." The car by its suggested momentum becomes a symbol for aggressiveness. The play tends to follow the course suggested by the nature of the objects, as the following protocol of the play of two boys (Amad and Leon) shows.

Amad was a nine-year-old Armenian boy with a mental age of 8.4 years and an intelligence quotient of 87. He had sustained a skull fracture at the age of seven years, by an automobile accident, and after that showed the typical post-traumatic psychopathic personality with constant overactivity and inability to adjust at home or at school. He was in constant conflict with all the other children and with society in general. Although of adequate intelligence, he was unable to attend to his school work because of his restlessness and his inability to concentrate.

Leon was a seven-year-old Armenian boy, overactive and aggressive. He was a child of dull normal intelligence (IQ, 80). He had a reading disability and was bilingual. According to his mother he was nervous and jumpy. She complained that he jumped out of open windows and went into the street without his shoes and other clothing. He would take matches and go

into the cellar to start fires. He beat his brother and other children. The public schools would not accept him. The child himself said that the other children of the neighborhood were bad and he referred all the complaints against him to his brother Jackie, who was subsequently observed on our wards and found to be a docile, well-behaved child, although normally active and mischievous. The two children were observed because of a suspicion of congenital syphilis, which was not confirmed. His mother said that Leon had threatened Jackie with a knife. When asked about it, he said, "If you would hit people with a knife they would die. Jackie took it from the knife place. He was going to cut sticks and to cut his hands." When playing with a toy gun, he said, "It shoots the bad guys, the crooks. They steal money from houses." (*Is it right to shoot crooks?*) "Yes, because crooks can kill you sometimes. They die, they steal money." (*Would you like to shoot them?*) "Yes, because they are bad."

The child related fantasies of fights between his puppy and the devil, and said, "The devil is like a horse but he is not a horse." He has a tendency to vivid confabulations. When he was asked about the puppet show, he said, "I forgot it, but I know another story. It was about Pinocchio — Washington. I saw Mickey Mouse too. Minnie Mouse blowed the whistle and Mickey waked up. They said wake up from the bed and he went outside and he saw a big wave. It was near the ocean. He went near the ocean and he saw an old man. I don't know the name. I saw him in the picture. They got a ladder and a rope. They got

horses and they went in his house and Minnie was sleeping and then Minnie went out and he went up and then the soldiers came with the bombs and then he throws it on the captain and he falls off the horse and the horse runs. Minnie catches one and he puts him on the floor and the horse runs. When Minnie goes under the horse, they throw a barrel on Minnie's back and Minnie died. That's all."

(Which part do you like best?) I like Minnie the best.

(Which part do you like the worst?) The worst is Minnie.

(Which part would you like to be?) Some cowboys are in it too. The end of the Mickey Mouse. Before Minnie Mouse goes, I like to see cowboys picture about Tom Mix. It is a good place.

(What would you do if you were a cowboy?) Nothing. They supposed to run. They run and get the bad guys. They kill them because they steal.

(Is it all right to kill a man who is stealing?) Yes.

(Would you like to kill?) Sure. I would kill them with a gun. Hit them on the head. Tom Mix did that to the bad guy. The dog was hiding behind the big bone and Tom Mix came and the horse was hiding and then Tom Mix came out and the bad guy came and Tom Mix hit him over the head and broke his head. The other fellow had a dog too and his dog killed Tom Mix's dog.

During the period of observation on the ward, the child was usually overactive and aggressive but amiable and well liked. He showed a marked tendency to imitate the most active and dramatic of the older children. The play protocols of Leon and Amad are as follows.

(Two soldiers shooting cowboy and Indian.)

Amad:

He shoots him and he shoots him. When he shoots the arrow, he bends down and he shoots him. (*Which one would you like to be?*) The soldier. (*Why?*) Because these are the bad guys. I don't like them.

(Children always bring in moral connotations immediately. They call one or the other of the tin soldiers bad).

(*What about this one—cowboy?*) He is going to shoot him (soldier) and before he can shoot him, he (other soldier) can shoot him (cowboy). The good guys are good and the bad guys are bad. (Pirate and cowboy.) That (pirate) is the bad guy and he is going to shoot him.

Leon:

He (pirate) is a bad guy because he has a knife. (Pirate and Indian.) They are both bad guys. With their bow and arrows they kill you. They are bad guys. (*Why?*)

Amad:

They got something wrong with their heads. [Smaller child invariably repeats what older child (Amad) is saying.] He (cowboy) is taking his gun out and he is going to shoot him (peasant).

Leon:

(Repeats.) The good guy (cowboy) is going to shoot the bad guy. (*Why is he bad?*) He has something wrong with his head.

Amad:

The cowboy is going to take his gun out and shoot him (Indian) and take his bow and arrow, and hands up the other guy (second Indian) and then these two guys (other cowboy and peasant) are safe. (Soldier in foreign uniform is added to group.) This is a German. He is going to get this guy (peasant) and get him by the neck and throw him down, choke him.

Leon:

He is going to kill him with a gun. With the sword he is going to cut his head off. (*Think it's right? Like to cut off head of bad person?*) It isn't hard. We could

kill the Germans because they are bad guys. (*Why think Germans are bad?*) They go out on the plains and shoot. (*I heard you wanted to kill your brother*). I don't know.

(Two cars and a man.)

Leon:

The car is going to run the good guy over. He will die.

Amad:

He don't die. He will get hurt and they will bring him to the hospital and he will get better and when he sees that truck again he gets that man and kills him.

Leon:

The man is going to break the car up and burn the man in the car so it won't run over him no more. (*How can he if he is dead?*) The car got electric and burns him up. The car could fall. The feet must go on the electric and then the car could fall. This car was coming and he is strong, and he went back that way; then that car comes and he doesn't see it and he gets hurt and they bring him to the hospital. He gets better, sees the truck, burns it up, puts it on fire and brings it in the river, makes the motor go.

Amad:

He put dynamite under it, then ran away.

Leon:

The car is coming and the man is going across and the car got the man run over, and the man got hurt. The car went right on the man's foot and the man got a broken foot. They bring him to the hospital. They gave him a stick and a foot to walk. When he sees the car he is going to take the wheels off and the motor off and put it onto his car, and break that car and throw it in the river.

(*Want to be strong or weak?*) Strong. You can fight more better. (*With whom?*) Him and me (after Amad had told him to say "with me").

knife, so he comes with all the guns and he is going to shoot that guy, etc."

(When a stronger man comes, should one run away or fight?)

Amad:

I won't run way. If you run away you are yellow.

Leon:

(Should you hit a smaller boy?) I don't hit smaller kids.

(Is it right?) No, because they are small.

Play becomes increasingly violent and many more of the lead soldiers are considered to be dead and are piled into the car. It is interesting how unrestrained the children are in play; they do not have any moral scruples to kill in play or fantasy. In this respect the differentiation between reality and fantasy is much stronger in children than in adults. In the play, the question of who is a "good guy" and who is a "bad guy" plays an important part.

There is an enormous amount of repetition in play, with almost the same words, as if the Gestalt which has been once formed were much more tyrannical than in the adult, and not so easily dissolved.

The Aggressivity Pictures were shown to Leon.

1. They killing this man. *(Why?)* Because they are bad guys. This is a good guy here. He is killing the bad guy. *(How do you know he is a good guy?)* Because he has the yellow hair. *(Why is the fellow with the yellow hair a good guy?)* I see his face. *(Why is he a good guy?)* This guy is on the side. *(How can you tell by his face?)* Because I saw him in the picture. He looks like Tarzan. This is a bad guy because I can see his face and I can see his neck. He is brown. He is a bad guy because he has a knife. *(Why is he bad if he is brown?)* I don't know.

(*What sort of bad things does he do?*) I don't know. (*Who would you like to be in this picture?*) None of them. (*Would you like to be Tarzan?*) No. (*Why?*) The lions come and kill everybody.

2. This is a bad guy and this is a good guy. (*How do you know?*) They have these things. These are things that nobody can hit over with the knife. They are going to kill those guys. They can kill them easy because they have more knives. (*Is it all right for good guys to kill people?*) Yes. These are bad boys. I can see the things (shields). (*How can you tell that he is bad?*) Because he has these. (*What is this?*)

3. The lion came and he knocked the boy off and he fell in the water. He is going to drown because he is going in the water. (*Why does the lion do that?*) Because he likes to eat people. (*Is he going to eat him?*) Yes. (*Is it a nice picture?*) No, because the lion is going to eat the boy up. (*Is it nice to be eaten up?*) No.

4. Two mens—they are walking. They stole that apple because—they are red apples. (*How do you know they stole it?*) Because he was running and he stole the apples from the store and he is going to take them and put them back in the store. (*What is he going to do to the fellow who stole the apples?*) He is going to put him in jail. (*Who do you want to be in the picture?*) Nobody. (*Why?*) Because.

5. A boat and a boy and a man. (*What is happening to them?*) I don't know. He is falling in the water. (*Why?*) He wants to swim. (*What will happen to him?*) He will drown. (*Why?*) Because the water is deep. (*Why does he jump in then?*) I don't know. (*Is it a nice picture?*) No. (*Why?*) Because. (*How can you tell they are not going to swim around and go back to the boat?*) They will swim and then go back to the boat.

6. That guy is hitting the good guy. He is going to throw him down the water. (*How do you know he is a good guy?*) Because he has a white shirt. I could see his color. The colored guy is the bad guy. (*How do you*

know?) Because they don't wear no shoes. They go barefoot. They are bad because they are brown. He is bad because I can see that thing (loin cloth). They are going to throw him in the water. (*Is it right?*) No. (*Which would you like to be?*) No one.

7. That man gave him a sock in the puss and he fell down. His stomach is his puss. (*How do you know?*) Because he is holding his fists like that. He must knock him down. (*What is the matter with him now?*) He is lying on the floor. (*Why?*) I don't know. He is doing exercise. This man was socked in the stomach. (*What is this?*) A star. I don't know what it means. (*Is it a nice picture?*) No, I wouldn't want to be none of them.

8. He is a bad guy and he is a bad guy and he is a good guy. (*How can you tell?*) Because I can see. He is a good guy and he has a knife to kill the bad guy. This is a bad guy because he has whiskers. (*Why do whiskers make him bad?*) Because he has a bigger knife. (*How do you know he is a good guy?*) Because I can see his face. (*Why is he going to kill him?*) Because he is bad. (*Is it all right to kill a bad guy?*) Yes. (*How can you tell a bad guy?*) I don't know. (*Are there any bad guys around here?*) Yes, crooks. (*How do you know they are crooks?*) Because once my mother told me downstairs a crook came in with a knife and killed her. The lady was in the bed sleeping so that he killed her. The lady had a telephone so she called the police and the detective come and they caught the crook and they put him in the electric chair. My mother saw it. (*What happens to a fellow in the electric chair?*) He dies. The electric comes. They put the wire around the back and then the wire comes and kills him. (*Is it a nice way to die?*) No. (*Why do it if not nice?*) Because he killed a lady. (*What would you do if you had a crook in the house?*) I would call my father. My mother and father was sleeping and I heard a noise and it was a crook and he came from the fire escape. I waked up my father and he came with a stick and my father hit him on the head and he

went out the window. We had three puppies—dogs and one died. They were brown. My father put the number on top. I have three dogs and one died and my father found one and we got three of them. They bring the crook to the police station. The man says if they are lost they will go back home. Before they bring the crook in the police station, the man take the crook to the police station. They aren't puppy dogs. They are big ones. They just put him on the floor and then the dog pushed the bad guy and the man comes and puts the bad man in the police station.

9. This is a shadow. A shadow kills the man. (*How?*) I don't know. The shadow comes from the wall. When you see something on the floor it is a shadow or something like that—it is a man. This is a shadow. The man is here. It killed that man. (*How?*) He steps on him and flies away. (*Is the shadow heavy?*) Yes. You see the shadow from the floor. This is a real shadow. (*What is a fake shadow?*) I don't know.

10. The lion is stealing the baby to eat it up. (*Is it a nice thing to do?*) No. (*Why does he steal it?*) The man is going to come to him. The man is going to hide behind here. First, he will get him and then he will go back and then he is going to have his tail pulled and then he is going to die.

11. (Flash Gordon.) That is a good guy. (*How can you tell?*) I see his face. Some of them have yellow hair. He comes in and then he is going to get him and then he is dead. The good guy gets out of the way. (*Are people who have dark hair bad guys?*) Yellow hair are good guys. Germans have yellow hair. They are bad. (*Are people with black hair bad guys?*) I don't know.

12. They are shooting bows and arrows on him. It looks like a funny man. (*Why should they shoot bows and arrows at him?*) I don't know. He ain't dead because I see his eyes are open. (*Does he like it?*) No. (*How can you tell?*) I can see his eyes open. (*Who is the good guy?*) The one who is getting shot.

According to Leon, all of those in the pictures who were getting the worst of the situation were good guys, also all of those who had blond hair and light complexion. Leon was of Armenian derivation with quite dark complexion.

These protocols show that the same principles which are valid for play are also valid for interpretations of attitudes towards aggressive pictures. We summarize as follows.

1. Aggressiveness in young children comes out in small units. It is open and does not follow the traditional character of the object.

2. After the fifth year or thereabouts, there is a strong tendency to simple moral orientations. The objects are classified into good and bad ones, but this classification is far from being rigid for them. The object is sometimes put into one group and immediately afterwards it may be put into the opposite group. Categories may become fixed, however, and the reason for the category may not be evident.

3. Aggressiveness may not come out openly in verbal expression; it tends to find free expression in play, and in the interpretation of pictures.

4. The expression of aggressiveness tends to be closely related to the structure of the object in the course of later development.

5. Aggressiveness is very often directed against specific groups, such as Indians, Germans, gangsters, etc.

C. FACTORS INFLUENCING AGGRESSIVENESS

In the development of play, motor impulses play a very important part. Every play implies the handling of an object. In the beginning, only the most primitive forms arise; in the further development, more complicated structures form the basis for the action. Aggressiveness is based upon this continuous interplay between form and motion. These observations will be discussed in a separate study. Whenever the motor impulses are increased, their relation to the form is changed. There is a strong tendency to break up the form into smaller units and to destroy any form as soon as it has been created. For instance, the child will put up a row of soldiers and lay them down immediately or shift the row to a new formation. At first the child may put soldiers into a car, but later put one car into another. There is a strong tendency to repetition of patterns of activity, and, as these are increased, the single phase will be shortened. Three- and one-half-year-old Joey gave short commands to the playthings. Not fully acquainted with the structure of things, he tried to make the soldiers stand parallel to the wall in the air. He ran the car around without any definite aim, making a siren-like noise. Strong hyperkinetic factors made it necessary for him to form a quicker orientation concerning good and bad and also regarding the physical qualities of the objects. The protocol of Clare is a good example of this.

Hyperkinesis is a state in which the number of movements greatly exceeds the normal. It usually cannot be attributed to specific problems, but may be

based on either constitutional factors or organic lesions of the brain, particularly of the midbrain region, which may occur in encephalitis. Newer investigations, especially the paper by Alfred Meyer (12), indicate that the lesion in the midbrain is the most important factor in the production of hyperkinesis. Kramer and Pollnow (11) have recently drawn attention to hyperkinesis which is not due to epidemic encephalitis but to processes of a different type. Constitutional and endocrine factors may also change the output of motility. Mittleman (13) has recently reported hyperkinesis in children with Froehlich's type of adiposity. Constitutional factors and the endocrine system are, therefore, important in the genesis of hyperkinesis. Children generally are inclined to hyperkinesis. It is a childhood pattern which can also be activated by psychogenic factors, as L. Bender has pointed out.

The aggressiveness of a child is not merely the expression of its motor constitution and constellation, but also the expression of its total life history. Hyperkinesis can be a reaction to environmental psychic factors as, for instance, in the case of Nora. This case very clearly shows that hyperkinesis, coupled with aggressive activity of a very severe type, may be largely a reaction to unfavorable environmental factors. Although the child had been subject to them during the greater part of her life and had suffered severe nutritional and developmental disturbances, the hyperkinesis and aggressiveness tended to disappear as soon as the environment and nutrition were improved. Nora was four and one-half when we last saw her. She was the

fifth child in a family of seven that suffered many vicissitudes. The father of the first four children had died, and Nora was illegitimate. When she was six months old her mother placed Nora and the next oldest (Patricia) in an institution in another state, where she remained for two years. Meanwhile, the mother married Nora's father and the family was reunited. What the history of Nora and Patricia was during their two years in the institution can be surmised only from the description of their condition and behavior when they returned home. It was said that both were very much emaciated and retarded in development. Nora did not speak at all. She refused all food except milk from a bottle and dry bread. She wet and soiled. She did not respond to any human contact and would either sit or stand in the same position for hours, unless moved. At night she slept poorly and tossed and moaned in bed. The behavior of the older child was similiar, but tended to return to normal more readily. For six months the mother attempted to care for Nora but she did not respond and did not improve, either physically or mentally. She was brought to the *Mental Hygiene Clinic* in this condition at the age of three and one-half years. She was noted to be extremely emaciated, with a protuberant belly and covered with scabs over her body. She did not speak; she would stand or sit in fixed postures, and showed no facial expression. This was looked upon as an extreme repression due to institutional factors. Convalescent care was recommended to build up her physical condition. She was sent to a convalescent home for children for three months and

gained some weight, but returned home still very much underweight, but now showing a different type of behavior difficulty. She was negativistic, irritable, defiant, and disobedient. She could speak, and expressed an open hatred for everyone. The mother cared for her at home again for a few months until the father was sentenced to jail. The child was then placed on a pediatric service for further care and study for her *nutritional deficiency and developmental retardation*, but she responded slowly. When taken home again, her defiant and antagonistic attitude had increased. She was subject to temper tantrums and still openly expressed her hatred for everyone. At the age of four and one-half she turned on the gas and said she wanted everybody in the family but herself to die. Meanwhile, the father had been released from prison but had died of pneumonia and the family situation was again in a turmoil. Social agencies were making *investigations to determine who should support this mother and her seven small children*. In one of Nora's severe temper tantrums she presented a picture which suggested a convulsion and was taken to another hospital which recommended observation at Bellevue. She was on the Bellevue Children's Ward about two months. On admission she presented the picture of a small, emaciated child in a continuous state of fury. She would stamp her feet, spit, scratch, dash at things, and destroy them if possible, grind her teeth, and fearlessly attack adults or children. However, she was very responsive to affection and her behavior gradually changed. She proved to be very sensitive to the social

environment and made herself the favorite in the group. She showed a great range of emotional responses and was dramatic in her expressions. She used her bodily motility and facial expression freely with considerable histrionic ability. Her speech was no longer retarded and she showed a rich vocabulary. However, if she were thwarted or reprimanded she would still respond with exaggerated sullenness or dramatic temper outbursts which more and more tended to assume a playful air. She was usually the center of the play activities of a group and played amiably as long as things satisfied her, but became assaultive if anything went against her. The following is a protocol of one morning's activities.

She started crying today when the other children went to school (and she was too young to accompany them). She developed a temper tantrum that lasted for ten minutes, during which time the examiner stood by her but gave her no sympathy. Afterwards she was angry at the examiner but followed the examiner to the office. An effort was made to win her friendliness again with toys but she would kick them away and then the examiner would push them back until this became a game. Then the toy soldiers were put in a little wagon and first kicked back and forth and then pushed back and forth. She lined the soldiers up and counted them to three and later to five. She pushed one aside and said it had to be put there because it had been bad and had hit her. She admitted that she hit people too, but would not admit that she had been bad. She found a pencil and asked to draw a picture. She said it was "the boy friend" but it looked just like a scribble. She continued to be very friendly. She whirled on the top of the desk, humming, and said she was dancing. She whirled until she was dizzy and then whirled in the other direction. She continued this

for a very long time. She asked the examiner to hold her hand and was very affectionate.

She improved physically, although the actual gain in weight in two months was less than two pounds; there was a redistribution of body contour with a flattening of the abdomen, a straightening of the back, an increase in height, and a filling out of the limbs and face. Her I.Q. was 91 at this time, although she had been previously considered defective. She was well adjusted to our group, except that she often wet the bed. She was always domineering, when possible with sweetness and charm, but when this failed, with open aggression. She rebelled at going home when her mother called for her and left the hospital crying.

D. DISCUSSION OF RESPONSES OF CHILDREN BETWEEN NINE AND FIFTEEN YEARS

The answers to the questionnaire of children of this older age group are more uniform.

Question No. 1. What is courage?

G.12, G.13, and G.14. Not to be scared.

G.16. You are healthy.

G.18. Nerve to do something.

G.20. You are smart; rescue something, like a cop, sailor, or fireman.

G.28. When you are strong and fight.

G.30. Courage to fight.

B.22. If something is dangerous and you are not afraid.

B.29. Strong and not afraid of anything.

B.33. To be strong.

B.34. You can take it when you get hit or shot.

B.35, B.47, and B.49. To be brave. Soldiers have to be brave; may kill them.

- B.37. We have to have courage; you don't care for your life.
- B.38. You can fight.
- B.42. You are not scared.
- B.43. In war, and as cop against gangsters.

The answers of this group are much more distinct and refer to more concrete situations. The interest in the objective world has become greater.

Question No. 2. What does it mean to be a coward?

- G.12. You are afraid to hit back.
- G.13. and G.23. You are scared.
- G.14. Somebody hits you.
- G.15 and G.18. When you can't fight.
- G.16. You kick.
- G.20. When you run away.
- G.21. Kick, scratch, bite.
- G.22. Using your feet.
- G.28 and G.30. When you are afraid.

- B.22. You are scared of everything. You should try to fight.
- B.29. Always afraid of someone.
- B.33. Does not care to fight.
- B.34. Afraid to hit.
- B.35. Scared of everything. They make fun of you.
- B.36, B.38, and B.42. Scared.
- B.43 and B.47. You run away.

Question No. 3. Why should one not be a coward?

- G.13 and G.23. Everybody will pick on you.
- G.14. You should not be.
- G.18. A coward kicks. It means that they are fresh.
- G.16, G.20, and G.22. You should not be a coward.
- G.19. It is not good to kick.
- G.21. You get hurt.
- G.28. Everybody picks on you.
- G.30. You are afraid.

- B.22. Nobody likes you. They call you coward and nobody speaks to you.

- B.29.* They kick you and make fun of you.
B.33. You can't hit back.
B.26. You get killed.
B.38 and *B.33.* They would pick on you.
B.35, B.40, and *B.45.* You should not be a coward.
B.49. A coward might cause death.

Although children of this age often have no clear conception of what a coward is, they have a clear insight of the negative value expressed in the term. They cram into the word everything of a negative value connected with fighting, wrong methods of fighting, running away, etc.

Question No. 4. Do you like to hit other children?

- G.12, G.16, G.20,* and *G.21.* No.
G.13. No, because they might hit me.
G.18. No, you will have no friend.
G.19. No, you are afraid.
G.28. No, you hit them and they feel sore.
G.30. No, unless they hit me,

B.22. No, but I wouldn't let them hit me; I don't want to be a bully; a bigger kid might come and hit me.
B.29. Not unless they hit me first.
B.32, B.33, B.38, B.42, B.43, B.45. No.
B.35. No, you might get hurt.
B.36. Yes, if they start.
B.46. If they hit you first.
B.47 and *B.49.* Only in order to hit back.

The answers to the questions in this group of older children are more clearly formulated and reflect the morality imposed by the adults in a more or less schematic way. But the child's fear of getting hurt is still clearly expressed, although in a more objective form.

Question No. 5. Is it nice (or right) to hit other children?

G.12, G.13, G.18, G.21, and G.28. No.
G.15. No, they don't bother me.
G.16. They get sick.
G.19. You get in trouble.

B.22. No, you get in trouble.
B.29. If they hit me first.
B.33, B.38, and B.45. No.
B.47 and B.49. If they hit first.

The answers here are practically the same as the answers to the question, "Do you like to hit other children?" Children of even this age level do not differentiate between what they like to do and what is right to do. They do not dare to profess that they like to do something which is not right.

Question No. 6. Would you like to be strong? If yes, why?

G.12. Yes, you are healthy.
G.14, G.15, and G.34. Yes.
G.13. You can do more things.
G.16. You can fight.
G.18. You get nice and healthy.
G.19 and G.21. You are healthy.
G.22. Yes, to play games.
G.23. I am strong.
G.28. You can fight.
G.30. You are able to hit.

B.22. Yes; no one will start to fight with me—I am not very strong but I hit back.
B.27. I would like to be like Jack Dempsey.
B.29. Yes, you can fight.
B.33 and B.34. Yes.
B.35. Yes, you can fight and win in boxing.
B.36. Yes, to lift things.
B.42. Yes, to fight.
B.43. Yes.
B.45. I like to take care of myself.

B.46, B.47, and B.49. Yes, I could play baseball (and other games).

Discussion will be included with the next discussion.

Question No. 7. Would you like to be weak? Why?

G.12. You are sick.

G.13. You have to take nasty medicine.

G.14, G.16, G.23, G.28, G.30, and G.33. No.

G.19 and G.21. You can't do anything.

B.22. No, because when you jump around you fall and hurt yourself and other kids hit you.

B.29. No, you are not strong and healthy.

B.31. No, you lose when somebody hits you.

B.34 and B.36. You can't fight.

B.35. You can't go out and win.

B.42. No, ma'am. I was weak a long time and I don't want to be weak any more.

B.43. No, I would let the others hit me.

Children of this age group already have a clearer conception of the connotations of weakness and strength, and the idea of weakness and sickness is unacceptable. Whereas in the lower age group strength is not wanted for any particular purpose, children in the higher age groups want strength for fighting and, nearer the age of puberty, for games or useful occupation.

Question No. 8. Should one fight with a stronger child?

G.12, G.13, and G.16. No, they would hurt you.

G.14. No.

G.19 and G.20. No, because she could fight with me.

G.23. Yes.

G.28. No, you are supposed to learn from them.

- B.22. No, because he will hurt you if you have a weak heart.
B.29. No, unless he starts up with you. He might get you down and you will always get the bad of it.
B.31, B.35, and B.42. No.
B.33. They could hit you.
B.34. You get knocked out.
B.38. He would beat you up.
B.43. Yes, you should not be a coward.
B.45 and B.46. Yes.

Question No. 9. Should one fight a weaker child?

- G.12. No, they might hurt themselves.
G.13. They might get sick and die.
G.16. They would die.
G.18. Yes.
G.19. No.
G.20. I would tell their mother.
G.21 and G.30. No.
G.28. You will hurt them.

- B.22. No, you might hurt them.
B.29. No, they will get a bloody nose and a black eye.
B.33. If he was bad I would hit him.
B.34. No.
B.35. No, he makes too much noise.
B.38. He would get hurt.
B.42 and B.46. No, he might have heart disease and die.
B.43. No, unless he hits a weaker boy.
B.45. No.
B.49. Rather not.

The difference between the younger and the older children in answering this question is slight. The older children also express the idea that they might get hurt by the stronger child and might hurt the weaker ones themselves.

Question No. 10. Is it right for a boy to hit a girl?

- G.12, G.14, G.19, G.22, G.23, G.29, and G.34. No.
G.16. No, they are sissies. Girls are never stronger.
G.21. No, he would hit me back.

- B.22.* No, because they are not so strong.
B.29, B.31, B.32, B.34, B.35, B.37, B.38, B.42, B.43, B.46, B.47, and B.49. No.
B.33. No, you are a sissy. If she hits you, he has to stay hit.
B.45. She might get sick.

Question No. 11. Is it right to hit a girl that is stronger? (For boys only.)

- B.22.* Some big girls fight but it isn't right to hit a girl; everybody says so.
B.29. No, not any girl; you aren't allowed to, but some boys do.
B.33. No, she will be hurt.
B.34, B.35, B.43, and B.47. No.

With increasing age, the taboo of hitting girls becomes stronger.

Question No. 12. Would you let a smaller child hit you?

- G.12 and G.13.* No.
G.14. No; hit her back.
G.16. No, I would tell her mother.
G.21 and G.28. Yes; I might hurt her.
G.23. Tell her mother.

- B.22.* I would push him away—I don't like to hit smaller boys.
B.29. No, they can't hurt you so much.
B.33. No, I would run.
B.34, B.42, B.46, B.47, and B.49. Yes.
B.43. Yes, a very small one.
B.45. No, stop him.

The tolerance toward the weaker one is more outspoken than in the younger group.

Question No. 13. Should you holler when you are sick?

G.12, G.13, G.14, G.19, G.24, and G.30. No.

G.15. No, because you will die.

G.16. No, someone will hit you.

G.20. No, it makes you sick.

G.28. No, it annoys the others.

B.22. No, you get worse; you use your lungs out.

B.29. You won't be able to get better.

B.32, B.33, B.37, B.42, and B.47. No.

B.34. It makes you worse.

B.35. No, you get a sore throat.

B.46. No, you might die.

B.49. No, you have to take it.

Question No. 14. Is it right to strike back at somebody who hits you?

G.12, G.13, G.15, G.18, G.21, G.28, G.30, and G.34.

Yes.

G.14 and G.16. No.

G.19. Yes, only if mother says so.

B.22. A boy who is big or your size, yes; a girl or a little boy you shouldn't.

B.29. Yes, but not girls.

B.32, B.34, B.36, B.37, B.39. Yes.

B.35. Not a stronger one; he will hit you.

B.46. No, only when they tell lies.

The right to respond with aggressiveness is almost universally acknowledged by girls as well as boys. Only in the highest age groups doubts arise whether one is justified in doing so.

Question No. 15. Is it right to hit somebody who insults you?

G.12, G.14, G.16, G.18, G.19, and G.23. No.

G.13, G.15, G.21, and G.30. Yes.

G.22. No, but I did it.

G.28. No, call back.

- B.22. You tell them not to.
B.29. Sure. (*Girls?*) No, I would tell the nurse.
B.33, B.42, and B.46. Yes.
B.35. Bigger boys, no—smaller boys, yes.
B.43 and B.47. Sometimes yes and sometimes no.
B.49. No, ask for an apology.

Older children do not see the absolute necessity for retaliating to insults with hitting, nor do the younger children. But further observation not included in this study has shown that curses against the mother, especially of a sexual nature, always justify an aggressive counterattack.

Question No. 16. What is a sissy and what do you think of them?

- G.15, G.16, and G.19. Boys who play with girls.
G.21. Boys who dress like girls.
G.23. Boys who fight with girls and can't fight.
G.28. A boy who plays with girls. (*Do you like them?*)
No, boys are rougher; they might hurt you.
G.30. They are not nice. They are all like girls.

B.22. A sissy is a show-off; he is no good.
B.29. Anybody who can't fight. I don't like them because they are not strong.
B.32. He is fighting with girls; he is a coward.
B.34. When they play with girls.
B.35. Afraid to fight.
B.37 and B.42. Acts like a girl.
B.41 and B.47. They are like girls.

The older children express a definite dislike for sissies although they hardly know what it actually means. For them, it is a boy who does not live up to some of the social expectations. It is interesting that their social code forbids boys to play with girls.

Question No. 17. Would you like to be a boy? (For girls.) A girl? (For boys.)

- G.12. No, girls have more hair.
G.13. You can be smarter as a girl; boys can't sew.
G.14 and G.16. No, because I don't like boys; when you get older you can go out with boys.
G.19. No, they are so fresh.
G.20. No, they go to war.
G.21. No, boys are fighting. Girls can wear rings and bracelets.
G.22, G.29, G.30, and G.34. No.
G.28. No, I would rather wear dresses than pants.

B.22. No; bad boys hit you and a lot of things. I like to play hard games like baseball and football.
B.29, B.32, B.34, and B.45. No.
B.33 and B.35. No, they can't fight; they wear dresses.
B.37. No, a man loves a lady more than a lady loves a man.
B.38. I would like to be a girl in war time. Girls don't have to fight. I would like to use a gun, but I might get killed.
B.42. No, a girl can't play baseball.
B.43. No, boys have more fun—baseball, skating.
B.46. Girls have too much housework to do.
B.47. No, boys are stronger. And the girls wear dresses.

The superficiality of the answers is astonishing. By merely studying these answers, one would come to the conclusion that many of the so-called sexual differences are more or less a matter of habit. But the pride in masculinity and femininity is so outstanding that it is probable there are much deeper motives responsible for the unwillingness to be changed into the other sex. The only answer expressing a desire to be changed to the opposite sex came from a negro boy, and it is questionable whether his wish to be a girl in the time of war expressed a real wish for a change in sex.

Question No. 18A. Should a girl fight? Should a girl hit a girl?

G.16. No, you get into trouble.

G.21. No. Then you are a tomboy and the boys hurt you.

(All the other girls say "no.")

B.22. No; she shouldn't start up, either. Girl to girl is all right; if one starts it, the other should hit her back.

B.29. A girl should not fight with boys but with girls.

B.33, B.45, and B.49. No.

B.35. They cannot fight.

B.34, B.37, and B.46. Yes.

B.42. No, they pull hair and scratch, but they do it.

Question No. 18B. Should a boy fight?

G.13, G.15, G.16, G.18, and G.19. No.

G.21. Yes.

G.28. No, it hurts.

B.22. Yes, when they hit you.

B.29, B.33, B.38, B.47, and B.49. No.

B.34. Yes, if somebody starts up with them, it is O. K.

If they don't it is out.

The older children as well as the younger deny the advisability of fighting. This is probably partially due to the way in which the question was put to them. The answers show that some amount of fighting is expected from boys and also from girls. The younger children usually give utilitarian reasons why one should not fight, while the older children feel more strongly that fighting is wrong in itself.

Question No. 19. Would you like to shoot (to kill) somebody?

G.12. No, also not gangsters.

G.14. Only the man who steals.

G.15. No, you get hung.

G.16. No. (*Gangsters?*) He gets the electric chair.

- G.18, G.23, G.28, and G.30. No.
G.21. No. (*Gangsters?*) Yes.
G.29. They should be only killed if they murdered somebody else.
G.34. Yes, when they are fresh.
- B.22. No. (*Gangsters?*) No. (*War?*) In war you have to, or they will come and destroy the country.
B.29. No, they put you in jail. In a war I would be on the American side and shoot Germans, because I don't like them.
B.33. No, only if they are bad.
B.34. If they are bad, yes.
B.36, B.37, B.43, B.47, and B.49. No.
B.42. No, you go to jail.
B.45. No, you get hanged.
B.46. Only in self-defense.

With increasing age, the expression of aggressiveness becomes diminished. The utilitarian point of view is supplanted by more general ideas of right and wrong. War and justice seem to offer some outlets for aggressive tendencies.

Question No. 20. Would you like to kill somebody with an ax?

- G.12, G.13, G.19, and G.21. No.
G.28. An ax is better than a gun. The gun is more dangerous.
- B.22. It would be worse than a gun. There would be more blood. I wouldn't like it.
B.29. No, a gun is better. You can bury him better if he is whole. If you had him in two parts you would be there about a half hour.
B.33. The ax makes too much blood.
B.34. An ax hurts worse than a bullet. I would like a bullet better; with an ax you have to chop them to pieces. I don't want to hurt them; just kill them. If they are bad I will take an ax if I don't have a gun.

- B.35. Yes, as a cop.
B.37. No. (*Crooks?*) Yes.
B.38. Yes, crooks.
B.43. No.
B.47. You better kill with your hands.
B.49. If I have no gun.

Children of this age more than the younger ones shy from the violence of the ax and prefer, as an instrument of murder, the gun to the ax, but are still not unwilling to use the ax.

Question No. 21. How would you defend yourself against a stronger child?

- G.13. Hit him.
G.18. I would be afraid.
G.21. Hit back.
B.22. Hit him and run away.
B.29. I don't know. I would try to hit him back but he would hit me harder.
B.45. I would try to get somebody to fight him.

Also, in these few instances the tendencies to reactive aggression are obvious.

E. AGGRESSIVENESS IN PLAY AND IN DESCRIPTION OF PICTURES

The play method and descriptions of pictures are less fertile methods of study in the older than in the younger children, but in children of 9, 10, and 11 years interesting reactions can be observed. The nine-year-old Marshal (B.24), who was very aggressive, describes Picture No. 1 in the following way.

- A man, they are fighting for their country. (*Is it right?*) Yes, so you can live. They have a war. (*Is it right?*) No, because most of the people get killed. It

is better not to fight. If somebody hit me, I wouldn't fight; I wouldn't start the fight.

Picture No. 8. I won't tell you that one. This girl must have got sore at him. She wanted to kill him. And there is a man who tries to get his knife out and there is a black man. That man wants to blackjack him over the nut. (*What do you think of girls that stab men?*) She should go to prison and get the chair, or get a rope around her neck, or prison for life.

In the play with the tin soldiers and Indians, he says, "The Indians hit white people because Indians have red skin. And these people have white skins and these people are their enemies." Confronted with another group of playthings, he actively enriched the play with his fantasy, and said, "These three guys are looking for treasure and they want to kill these people so they don't get the treasure. One guy gets behind him and sticks him up. He gets no chance. He goes behind him and this guy calls him and he goes all around and goes over here. Then he pushes them. Then they shoot down the enemies." He takes particular pleasure in having the toys fall over. When the physician pushes the doll over, the boy says, "That is no way to do it. I'll show you how to tip a girl over."

Aggressiveness shows itself in this boy in the play with the toy soldiers as well as in the interpretation of pictures. He feels that any slight difference is justification for group hostilities. It is also enough reason for hostility that "one gets sore on somebody." He furthermore approves strict and thorough punishment. The psychological features of the earlier stages of development as seen in the younger children are pre-

served in this hyperkinetic boy who was above average in intelligence.

No fundamental difference between boys and girls was observed. The nine-year-old Vivian (G.11) says when Picture No. 8 is shown to her:

A lady; she is going to kill a man. Maybe he did something to her. (In the play with the tin soldiers.) This is a soldier. He is going to shoot Indians. (*Why?*) Because they are having war. They are fighting because it comes to the end of the world and everybody dies. (*Who makes the end of the world?*) God. Sometimes it is rainy and stormy; everybody dies. (Two Indians are placed so that they face soldiers.) They are going to jump on the two Indians. (*Why?*) They don't like them. They shoot with bow and arrows. (*Which ones are right?*) The Indians because they did not hit anybody. (*Which would you rather be?*) The Indians because they don't hit people first.

This was a negro girl who evidently identified herself with Indians. Her play with dolls was not merely determined by the form elements such as are seen in the younger children. Still, even the china dolls were paired off by her and she arranged them in different symmetrical forms, moving them from one form to the next, sometimes by means of the cards. One gets the impression that, in the play of older children, the objects and figures are used much more in accordance with imagined situations than according to the formal laws which determine the play of younger children.

Even at this age, children face the death of others with an astonishingly cool objectivity. It seems to be sufficient reason for killing that "one is sore on somebody," does not like him, and so on. Characteristic in

this respect was the answer of another nine-year-old girl (Helen P., G.14). She says of Picture No. 12, "The bad men are going to kill her and him." (*Why?*) "Because they like to see blood. They just see red in their eyes and so they want to see blood."

But even at the age of eleven similar features may be observed.

Charles (B.35) was a boy of eleven. He was brought to the Children's Observation Ward by the Children's Court, as a delinquent child. His mother stated that he was incorrigible, ungovernable, and disobedient. He threw things about the house and used vile and indecent language. He and his siblings were in court on several previous occasions as neglected children, because they were in the habit of begging while in a filthy condition. The boy was asked what he would like to be when he grew up and he said, "A cop. You have a uniform and you will be able to kill somebody. You get some crooks and lock them up." (*Why do you want to kill people?*) "I want to save people. I could kill crooks because they kill everybody else." (*Whom do you want to save?*) "People who are being killed."

He was given a group of soldiers, carts, and automobiles to play with.

They had a war, the Americans and Indians. I am on the side of the Americans because that is my nationality. (*What is the matter with Indians?*) They can't fight so good. I am only playing with them. Here is the battlefield. (Puts all soldiers in cart and puts them in another position.) Bang-bang — that guy is dead. (Americans kill four Indians. One Indian knocks down

an American.) (*Why does he do that?*) I don't know. These are Americans. They are having a war because they don't like Indians because they fight too much. These are Americans. They don't fight so much. They are just having a little war. That (the automobiles) is the place where you carry things because they can't carry them in their hands; they are too big. (Lines all the vehicles up. Lines soldiers up along edge of table.) I am going to line some over here too. These are going to be the guards around the blockade. These are near the gate so the people don't come in and rob things. They have to have a place for the car to go through. (Lays them down and puts them to sleep.) The other men may come after them; the men who try to make war with them. They think they are bad. They kill everybody. (*Why?*) I don't know. (Lines vehicles up in a series, whereas they were parallel before.)

(Blows taps.) Now you have to get up. They have to get up at six o'clock in the morning to get dressed. They go two by two. This is the rear guard. (Divides men into two groups.) These are all his men and these are his. (Children have a tendency to make form and structure an important part of their play, which is probably the background for army maneuvers.)

(Is now distracted by the dolls and lines them up in the same way. Quickly loses interest and goes back to the soldiers. Puts soldiers in car so they can have a ride.)

He responded to the questionnaire in the following way.

1. (*What is courage?*) I don't know. Courage is brave. You are not scared of anything. Like when a soldier is against anybody they have to be courageous; they have to be brave because maybe the people might kill them. (*Is that good?*) Yes. (*Won't you get killed then?*) No. Your mother tells you not to fight and not to go to war and then you wouldn't be killed. (*Would you be brave then?*) I would say I want to go but my mother

won't let me. (*Suppose you don't have a mother?*) I would go to war and be killed.

2. (*What does it mean to be a coward?*) You are scared of everything. When you are afraid of anything, you are a coward. (*Is it good?*) No, because everybody thinks you are scared, because they all make fun of you and then you don't like it. (*Which is best?*) It is best to be brave and don't get killed. You just go to war. (*Suppose you get killed?*) That is all right. (*What is it like?*) You get shot. Then he is buried. (*Is that good?*) No ma'am because then you don't go no place; then you get no candy and you go to heaven. (*Is it nice there?*) Yes ma'am. It is all right to be dead. (*What does one do in heaven?*) You get shelter there. God is up there. He helps you. I know He is there because my house mother told me that in the . . . Foundation.

4. (*Do you like to hit other kids?*) No, because then you get hurt yourself. (*Is it right to hit other kids?*) No, because then you get hurt yourself.

5. (*Is it right to hit other kids?*) No; then you are being cruel because they hit you. (*Should you hit somebody smaller?*) No, then you are a coward. You shouldn't hit little children.

6. (*Would you like to be strong?*) Yes, then you can go to boxing rings and you go other places and you can beat everybody up. You can win everything.

7. (*Would you like to be weak?*) No. Then you can't go out. Then you are sick. (*Can't you be weak without being sick?*) Yes. But you won't be able to go out and play. You can't win in fights.

9. (*Should you fight a weaker boy?*) No ma'am, because then you can beat him up easily. (*Is that right?*) No; then you are always hitting. Then they always cry. They make too much noise. (Stops to shoot all the Indians and soldiers.)

10. (*Is it right to hit a girl?*) No ma'am, because then you are getting fresh with them. You are hurting them. (*Suppose it is a strong girl?*) I don't know. Then you are hurting them, too.

13. (*Should one holler when one is sick?*) No, because it makes you worse. Then you make yourself worse. You make yourself a sore throat.

14. (*Is it right to hit back when somebody hits you?*) Yes. If they are bigger than you, you won't hit them because you are scared of them. If they are littler, you will hit them. No—you can't hit them. You can hit back the big ones.

15. (*Is it right to hit somebody when they insult you?*) No. You will walk away from them. You don't like them no more. (*Don't you hit people you don't like?*) Yes ma'am. Yes, I guess you do hit them if they insult you. (*Suppose they are bigger?*) Then you don't do nothing. (*Suppose they are smaller?*) Then you do.

16. (*What do you think of sissies?*) Sissies are people who are afraid to fight. They don't know how to fight so good. A boy who lives around my way is a sissy. I don't like him. They are girls. They don't know how to fight. (*Don't you like boys who don't fight?*) Sure I like them. I like girls, too. Sissies don't know how to fight and it makes me sore.

17. (*Would you like to be a girl?*) No ma'am. They can't fight and they wear dresses. A dress goes up and everybody looks underneath. That is being sloppy. You are being a slob. A slob is a person who doesn't know any manners. (*Is a slob a person who eats with his fingers?*) Yes. I mean you make a lot of mess. You are eating and the stuff spills.

18. (*Should a girl fight?*) They can't fight. I put on one of the boxing gloves upstairs and tried to hit Mr. D. (*Why is it important to be strong?*) Then you can beat everybody up. (*Is that good?*) No ma'am. You have to win everything. Then you have some victory. You get prizes.

19. (*Would you like to shoot somebody?*) No, then you are killing them and then you get the electric chair. (*Cop?*) Oh, that's all right. Then you could kill gangsters instead of a good person. (*Why would you like it?*)

Because they kill somebody else. They always kill somebody else. (*Would you rather kill them yourself?*) Yes, then you are saving people. (*When is it right to hit somebody?*) When they are sore at you. Even if they have a right.

21. (*How should you defend yourself against a stronger boy?*) You go like this—bang. If he is much stronger, I would tell my mother. That would be a coward. (*Would you do it anyway?*) No. I would tell somebody else.

He described the pictures as follows.

1. That is a war. This is Flash Gordon and he is fighting with all the men. He is a man on the funny sheet. He is all right because he is an American and these are from other countries. He can fight them if they are bad. These are bad because they kill everybody. (*Which one would you like to be?*) This one, because he is strong. We take the swords and stab them. I would stab with the sword because they shouldn't kill anybody. It would not be so good, because then you are killing everybody else.

2. I don't know what that is. Some soldiers marching, going into the country. (*What is going to happen?*) I don't know. (*Is it nice?*) Yes ma'am, because they are people there and swords here. They are going to have a war because they don't like them.

3. This is Tim Tyler. The hippopotamus turned over his boat and he lost the oar. He is going to drown. (*Is that nice?*) No ma'am. Maybe he can't swim.

4. He is taking three tomatoes or three apples and he is going to throw them at somebody because he don't like them. Maybe he is trying to be funny. He is going to sock him for taking those tomatoes and throwing them. (This boy believes that both of the figures are aggressive.)

5. They are jumping out of the boat. I don't know what they are doing. Maybe the boat hit a tree or a rock. I don't know what will happen to them.

6. Here Flash Gordon is going to be thrown over because they don't like him. (*Why?*) I don't know. (*What will happen?*) He will be killed. (*Why do it?*) I don't know.

7. This is the same picture. He took the tomatoes. He knocked him cold. (*Why?*) Because he took the tomatoes.

8. He is going to kill the man. (*What for?*) I don't know. (*Why?*) Because she doesn't like him because maybe they are bad and she is good. They might kill somebody. (*Is it better for her to kill them?*) Yes, because they are bad and she is good. (*Is she good if she kills them?*) No ma'am. Maybe they are in another country.

9. This is a bat with a man's head on. Somebody killed him. Maybe the bat killed him because he is flying away. Maybe that is a gangster. (*Why kill him?*) Because gangsters always kill somebody. (*Where do gangsters come from?*) I don't know. In Dick Tracy they was crooks who come from the underworld. (*Are they like other people?*) No. They steal. Sometimes they are little boys. (*Are they different from other boys?*) Yes, they steal. (*Can you tell the difference when you look at them?*) No.

10. This is a bear taking a baby out of the cradle. These are good men. These men are going to kill the bear with a gun, or with fists. (*What will happen to the baby?*) It is going to die. The bear will bite it.

11. He is going to kill this man. He don't like him. Maybe they are going to hurt him. (*Is it right to kill?*) Yes, because this man was going to kill him.

12. They are killing him. (*Why do that?*) I don't know. Maybe they don't like him. They have him tied up there.

Another eleven-year-old girl (Josephine, G.19) said of Picture No. 1: "They are having a war. They are fighting and killing people and throwing knives." (*What for?*) "They get mad."

Helen S. (G.23), twelve years old but with a mental

age of nine and an IQ of 74, says of Picture No. 5: "They are throwing the man in the river. It isn't right. They do it because they are bad people."

The following answers of John H. (B.46), twelve-year-old boy, show that the infantile trends were no longer effective in him. We will give a short report about this extremely aggressive boy in order to show that at this age the aggressive tendencies do not express themselves in the questionnaire and in the interpretation of the pictures, although his behavior was dangerously aggressive and asocial. We know very little in this case about the psychogenesis of this aggressiveness.

John was a twelve-year-old colored boy who had been referred from the Board of Education with the statement that he had been subject to very peculiar behavior. This was described as moods of deep depression, during which time he suddenly assaulted other children. It was also said that he would hold a child *and beat him until rescued. He nearly tore the ear off one boy.* He bored a hole in the wall, and broke electric light bulbs. He was subject to bad temper tantrums followed by stubbornness, and this in turn was followed by the so-called depressive period. This boy was in the ungraded school, although our psychometric examinations showed he had an IQ of 84 and should have been able to make advancement in regular grades. However, he was a chronic truant and at one time he was placed in the Parental School. When first admitted to the wards he was cooperative and communicative. He admitted his bad behavior and said it was due to poor associates. He showed a strong

sense of guilt. From his descriptions it became apparent that the periods of so-called depressions were sullenness with feelings of guilt following bad behavior. He stated at once that he had been told that he had come to the hospital just to be examined and that under no conditions would he remain in the hospital. It was explained that he was to remain for an observation period and that future plans for his welfare would depend on his behavior in the hospital. John immediately became sullen, uncommunicative for a day or so, but this was followed by a period in which he seemed to be making some sort of adjustment to the activities of the other children. It was noted that he was becoming a ring leader of a rather large group of adolescent boys and that, if necessary, he would bully the other children into accepting his leadership. It was finally revealed by the other children that John was organizing a well-calculated plot to escape, both for himself and any others who were interested. He had hidden under his mattress an iron bar from a bed and a rope which some painters had left in the ward. He also stole from a nurse's desk a crank which is used to open the windows. His plans were to knock a nurse unconscious at night, take her keys, and open the door, but to make his plans doubly sure he calculated that if necessary he could open windows and escape from the eighth floor by means of the rope. John left the hospital with recommendations for placement in a correctional institution. His description of the pictures was as follows.

1. Flash Gordon is fighting. They are fighting for their country. (*Why?*) They don't want anybody to

to take it away. (*Is that right?*) Maybe they are trying to take his country. (*Is it right?*) If they haven't got any. (*Who would you like to be?*) I wouldn't like to be anybody. (*What would you do in a war?*) I would have to fight. (*Would you like it?*) No ma'am.

2. They are Flash Gordon's men. They are standing still. They are going to fight. (*Why?*) For their country. (*Do you like Flash Gordon?*) I don't know. (*Would you like to be him?*) No. (*Good or bad?*) Good. (*What makes him a good person?*) don't know.

3. A rhinoceros is turning over the boat to get the people and eat them. (*Why?*) He likes it. (*Why?*) I don't know. (*What will happen to the man?*) He will get killed. (*What does that mean?*) He will die. (*What does that mean?*) You can't talk, you can't do anything. (*Is it good?*) No. (*Why not?*) I don't know.

4. It is a man standing on the street. He is holding something in his hand. (*What?*) He is going to hit the other man with something. The man is going to beat him up. The man thought he was going to hit him on the head. (*Which one is right?*) The one with the apples.

5. A boy and man jumping out of the boat. (*Why?*) It looks like the boat is wrecked. They bumped into a tree. (*What is going to happen?*) They could get killed. (*How?*) From the water.

6. They are going to throw General Jim off the cliff. (*Why?*) I don't know. (*Should they do that?*) I don't know. (*Is it all right?*) No. He hasn't done any harm. (*Is it ever all right?*) If he did something.

7. One man hit another for nothing. (*Why?*) He thought he was throwing a tomato at him. Those are stars. It means he is seeing stars. (*Why?*) He hit him too hard.

8. The girl is going to stab the man. (*Why?*) I don't know. Maybe he did something wrong. (*What sort of thing?*) I don't know. (*Is it right?*) If he did anything wrong. If he killed somebody.

9. A man is dead. Somebody killed him. (*How do you know?*) He couldn't die himself. (*Why not?*) If you kill him you have a reason for it. (*How do you know he is dead?*) You don't see him moving. That there is some kind of shadow. Maybe that is the one who killed him.

10. It looks like a tiger. He is taking a baby out of the crib. The mother is sleeping and the father is waking. (*What is going to happen?*) He is going to kill the baby. He is hungry.

11. Flash Gordon is fighting. (*What is happening?*) He is fighting two men. (*Would you like to be him?*) No. (*Why not?*) I don't know. (*Don't you think a man should fight for his country?*) If he had to.

12. A woman is tied by the neck. They are going to kill her. They don't like her. (*Why?*) I don't know. (*Doesn't she look like a good girl?*) Yes.

13. They are shooting bows and arrows at the man, to kill him. He did something. (*What?*) He was a traitor to his country. (*How?*) You can tell. (*Is it right?*) If he betrays his country.

His answers to the questionnaire were as follows.

(*Why shouldn't one be a coward?*) I don't know. (*Should one be a coward?*) If they want to. If you don't want to be a coward, you don't have to.

(*What is a coward?*) Some people are afraid. A coward is afraid of animals, afraid to do things. (*Is it good?*) No if you are a coward, they will pick on you and you are afraid to hit them back. (*Is it good to be a hero?*) Yes. (*What is a hero?*) You fight for your country and win. (*Can you be a hero without war?*) Yes. You can stop bad people like gangsters. (*How?*) You can shoot it out. (*Suppose you get shot?*) You can be a hero anyway. (*Which would you rather be, a live coward or a dead hero?*) A dead hero. (*Why?*) . . .

(*Do you like to hit other kids?*) If they hit me first. (*Is it right?*) No.

(*Is it ever right to hit somebody else?*) If they ever do anything to you. (*What?*) Telling lies.

(*Would you like to be strong?*) Yes. (*Why?*) You can carry more things. (*What would you like to carry?*) Anything. You can fight other kids. (*Would you like to be weak?*) No. (*Why not?*) You can't fight good. (*Should you fight with a stronger boy?*) If you are not afraid. (*Should you fight with a weaker one?*) You shouldn't fight with him. (*Why not?*) Maybe they have a weak heart. You should be afraid of a stronger boy. (*What is likely to happen?*) If he wins, there ain't much to do.

(*Is it right to hit a girl?*) No. (*Suppose she is stronger?*) . . . (*Would you let a smaller boy hit you?*) Yes. (*Why?*) . . .

(*Do you think it is right for a fellow to holler when he is sick?*) No. You should save your breath. It ain't good for you. (*Why not?*) You might die.

(*Is it right to hit somebody back when they hit you?*) No ma'am. (*Is it right to hit somebody when they insult you?*) Yes. (*Suppose they are smaller?*) It isn't right.

(*What is a sissy?*) One who hangs around girls all the time. (*Why?*) He—because he wants to be a sissy. Maybe he is weak like girls. (*Do you like them?*) No.

(*Would you like to be a girl?*) No, there is too much housework. (*If the men were doing the housework and the women were working, would you like to be a woman?*) No.

(*Should a girl fight?*) If they want to. (*Do you think it is right?*) Yes and no.

(*Would you like to shoot somebody?*) If they shot at me first. (*Suppose it is too late?*) They may miss you. (*Would you like to shoot a gangster?*) If they shot first. (*How about a German?*) I would shoot them.

F. THE PSYCHOGENESIS OF AGGRESSIVENESS

George (B.41) was admitted to the Bellevue Psychiatric Hospital twice. The first time was in August,

1932, at the age of eight years. He was brought by order of the Children's Court because he refused to cooperate for necessary treatment of a skin condition. It was learned that his father was a patient in a state mental hospital with a diagnosis of dementia praecox, paranoid type. One of his brothers was a behavior problem, while two other brothers at home were said to be temperamental. The history of this child showed that he was difficult from the age of two years; he was unstable and stubborn, and ran away from home. It was felt his behavior was distinctly related to the father's behavior while he was still at home. On one occasion his father threatened to kill his mother with a shot-gun. On this occasion George jumped on his father from behind and pulled him to the floor, screaming, "Pop, don't shoot." It was believed he had saved his mother's life, as the gun went off in the air. George had an unusual series of severe accidents. It was a question as to whether his behavior was not a result of these injuries which may have produced a post-traumatic encephalopathy. Yet his behavior preceded the accidents and was probably the reason for them. At the age of six years he attempted to climb from one room to another via a fire escape, and fell six stories. He was taken unconscious to a hospital. He suffered a cerebral concussion and lacerations of the forehead.

At the age of eight years he was struck by an automobile while in the street. He was taken to a hospital, unconscious, with a concussion of the brain and a fracture of the clavicle. There was no definite skull fracture.

At this time George was first admitted to the Bellevue Psychiatric Hospital. He had an IQ of 94. He was found to be very deeply devoted to his mother and bitter against his father. From Bellevue Children's Ward he was transferred to the Psychiatric Institute, where he remained six months and was discharged on condition that he be placed in a boarding home. However, after a period his mother removed him from the boarding home and took him home, where he was in 1934 when his father was paroled from the state hospital. George was readmitted to the Bellevue Psychiatric Hospital in December, 1934, in full restraint by police officers, with a history that he had attacked his brothers with a ball-bat, and, when an effort was made to control him, he tried to jump out of a window and threatened to kill himself and the rest of the family.

When George was able to control his agitation he explained that since his father had been home he (the father) had again threatened to injure George's mother. The father had come in the house, had carefully sharpened the butcher knife, and then hidden it. The children were all terrorized, but the mother, as was her custom, took no strong stand in the matter and defended the father on the ground that he was sick. George admitted hiding the bat under his pillow. He expressed vague fears of his father, brothers and sisters, and all the neighbors. He claimed that nobody liked him. Everyone talked about him and teased him and they knew he was "nuts anyway." He admitted getting angry because his brothers tried to take away his bat. In his anger he struck in every direction and said

he wanted to kill the others and die himself. He was a sensitive child, frightened and harassed. He complained of the brutality of the other children and tried to keep to himself.

On one visiting day, when his mother didn't come as she had promised, George developed an acute depression with great anxiety, expressing fear that she might have been hurt by his father. Realizing that these fears were not ungrounded, the physician made an effort to contact the mother through the local police and found that nothing had happened. George seemed to be reassured, but when his mother came next visiting day he demanded that she remove him from the hospital. When she refused he became sullen and angry and treated his mother in a most amazing way, telling her he hated her and calling her bad names. The mother then broke into tears and said George was just like his father when he was at his worst. After his mother left the hospital George got a large ruler and came to the doctor's office, expressing his intention to kill the physician. He smashed furniture right and left. He was again returned to the Psychiatric Institute.

The psychogenetic factors which increased the aggressiveness of this boy are rather obvious. He protected the mother against the violent father. He must, therefore, be more violent than the aggressor. He had to force his father into the same passive position in which the father had forced his mother by his aggressiveness. In his violence against his brothers and mother he was taking the father's place. Of course,

the psychogenetic factors do not create aggressiveness, which is a universal factor in human life, but merely accentuate and direct it. The boy continually felt attacked and disliked by others. His aggressiveness is at least partly reactive, coming out of the identification with the mistreated mother. This is the same mechanism found by Keiser and Schilder (9) in criminal aggressiveness. This boy's masochistic tendencies are revealed by his ready exposure to severe accidents. The head injuries he received as a result of his inclination to expose himself to accidents may have added an organic factor facilitating the expression of his aggressive and submissive tendencies. There is always a reactive factor in aggressiveness. If the individuals are not exposed to direct attacks, they may react to imagined aggressiveness in others.

Shirley (G.30) was a fourteen-year-old Jewish girl who was sent to the hospital by the Children's Court on a charge of delinquency because she had threatened the life of a schoolmate. She had reached the 8B grade but was having difficulty making progress in school because of her inferior intelligence. She had an IQ of 60. Six to seven months before entering the hospital she had been found, by a police officer, loitering near the river. She said she wanted to commit suicide. The family was investigated by the Crime Prevention Bureau. The mother was found to be a neurotic, unstable individual who was preoccupied with her heart condition. She also felt that her children, including Shirley, had heart trouble. It was found that Shirley had been fighting with her sisters as to which

one should do housework and it was for this reason she was contemplating suicide. However, the family did not seem at all concerned over the incident. It was after this that Shirley got into trouble at school by threatening a schoolmate named Julian. Formerly, in another school, she had been a great admirer of Julian. It was said that Julian danced in vaudeville and had her hair fixed up in a beauty parlor. When the two girls met again in a new school, Shirley tried to renew the old friendship, but Julian paid no attention to her. Shirley then became excited. She said that Julian and her mother both bleached their hair and that only bad women did that sort of thing. She became most excited when Julian accused her of bleaching her own hair. This was justified since Shirley had spent the summer in the country and her hair was bleached by the sun. Shirley admitted that she threatened to kill Julian. She said she wanted to get her hands on her because Julian called her a "bleached-haired bum" and intimated that she went out with men. She admitted writing threatening notes and putting them under the door of Julian's home. The difficulty between these two girls became so serious that on one occasion the teacher had to call in officers to separate them. At this point, Shirley's mother took her side, came to the school, and could not be made to leave until an officer escorted her from the grounds. The mother was advised to take Shirley to a psychiatrist and was told she could not return to school until she did so. Shirley's excitement revived and was stimulated by a sympathetic excitement of the whole family. She claimed that

all the schoolgirls were calling her crazy and that she wanted to kill herself. She claimed Julian was keeping her away from school. She became more threatening till the matter was brought to court. On admission to the hospital she was very excited. She said they sent her there to make her crazy. Pediculi were found in her hair, as a result of which it was washed and treated with tincture of larkspur. She claimed that nurses were trying to spoil her hair, trying to make it turn gray; that they wanted to make an old woman out of her. She was gradually reassured, however, and made a fair adjustment to ward routine, except that she was quick to make misinterpretations and take offense. When she saw a group of adolescent girls whispering and giggling, she said they were talking about her, and wanted to kill them. At such times she became very excited, muttering that she would kill them. She was easily reassured. Shirley was much concerned with her physical attractiveness. She was fully matured for her age and liked to dress like a grown-up. In spite of her inferior intelligence she was clever in imitating Mae West and Zazu Pitts and assumed some of the mannerisms of these actresses. As a matter of fact, the other children did giggle and whisper about these mannerisms. It is of special interest that this girl's paranoid attitudes and strong aggressive reactions were first expressed against a girl she really admired and whose friendship she had sought. She threatened to kill this girl because she believed she said the very things against Shirley herself which Shirley actually said against Julian, namely, that she

had bleached her hair. Her main interests and pre-occupation were with those things which concern an adolescent girl—her physical attractiveness, tendencies to imitate mannerisms of admired movie stars, and the problem of whether or not she is accepted by the group. Her aggressiveness was a defense for these attitudes. Verbally, she threatened to kill, but at some time she always claimed she didn't mean it and only wanted to get her hands on the offender.

Her answers to the questionnaire were as follows.

1. (*Do you have courage?*) Well, sure I have.
(*What is it?*) If you have courage enough to fight.

2. (*What is a coward?*) Someone who is afraid.

3. (*Should one be a coward?*) No. (*Why not?*)
You shouldn't be afraid.

4. (*Do you like to hit other children?*) No, unless
they hit me.

5. (*Is it right to hit other children?*) No, unless they
hit me. (*Is it right to hit somebody else?*) No.

6. (*Would you like to be strong?*) Sure. (*What
for?*) Strong—I like to be strong to hit. (Shakes fist.)

7. (*Would you like to be weak?*) No.

8. (*Should one fight with a stronger girl?*) Well—
I do not think so.

9. (*Should one fight with a weaker girl?*) No.

10. (*Is it right to hit a boy?*) If they get smart. If
they like to get funny. (*How?*) Never mind. (*Is it
right to hit a boy who is weaker?*) No.

12. (*Would you let a smaller girl hit you?*) No,
because she is not my size.

13. (*Should one holler when one is sick?*) No, I don't
think so.

14. (*Is it right to strike back when somebody hits you?*)
I think so.

15. (*Is it right to hit somebody who insults you?*)
Sure.

16. (*What do you think of sissies?*) Sissies are—I don't think they are nice. There is one sissy around here and he likes to act like a girl—a little fat boy. I think they are silly.

17. (*Would you like to be a boy?*) I would like to be just what I am.

18. (*Do you think boys are better?*) I don't know about that.

(*Why is it important to be strong?*) If you are very strong, it is good enough to fight.

19. (*Would you like to shoot somebody?*) No. (*Why not?*) They don't do nothing to me.

20. (*Would you like to kill somebody with an ax or a knife?*) No. (*Suppose they did something to you?*) If they bother me, I wouldn't kill them. I would smack them. (*Which way would you prefer to kill them?*) I wouldn't kill them with anything.

(*When is it right to hit somebody?*) It is right to hit somebody if they bother you.

21. (*How would you defend yourself against a stronger girl?*) Well—I don't know.

(*Should a boy hit other boys?*) No. (*Why not?*) Because. (*Should a girl hit a boy?*) No.

(*Should a girl holler when she is sick?*) No.

(*Should a boy fight?*) No. (*Why not?*) It isn't good.

(*Should a boy be a coward?*) No.

(*Should one fight against a stranger girl?*) Yes.

(*Under what conditions?*)

This girl apparently reacted with aggressiveness to the lack of love in a girl to whom she was unconsciously attracted. She had to invent the aggressiveness in the other girl, a mechanism which is well known in the psychology of paranoia. To this paranoid persecution she reacted with open violence. This violence which she also expressed in her answers to the questions prob-

ably would not have found such free expression if there had not been an intellectual inferiority. This is another example in which organic inferiority facilitates the breaking through of open aggressiveness. The deeper psychological motives in this organically facilitated aggressiveness are identical with the psychogenically determined aggressiveness. The organic defect (whether due to disease process or constitution) merely magnifies what otherwise might have remained unnoticed. It acts only as a resonator and magnifier.

G. CONCLUSIONS

Aggressiveness as the tendency to use violence against the bodies of other human beings is undoubtedly one of the characteristic trends in the psychology of a human being. It becomes manifest in the attitude and behavior of the younger children. The destructive tendencies are directed against animate as well as inanimate objects. The destruction consists of tearing the objects to pieces, either by hand or by mouth. The destroyed object may be put into the mouth and be eaten. Mild destructive tendencies may express themselves by pushing the object away, throwing it away, or, if it is an animate object, by inflicting pain.

Aggression results from experimentation with objects in the external world. In order to analyze, it is not enough to touch it; to learn its texture and consistency one must literally tear it to pieces. The resistance of an object to this procedure is one of its characteristics. The reaction of animated objects in this respect is particularly interesting. The search for the physical

qualities of an object tends to become a hard test for the endurance of the object.

Of course, the child necessarily gains a sense of power by this aggression. He becomes the master of the object. In trying to investigate the bodies of others by more or less destructive methods he also becomes better aware of his own body. In wrestling he discovers how far a body can be compressed, and, in scratching, biting, hitting, wounding, and pushing, other important qualities reveal themselves. The child learns how much it can do with objects and how far it can master them. Our protocols corroborate the contention of S. Isaacs (8) that children are never contented. They want all the playthings and all toys available. A possessive greed, with strong oral tendencies, belongs to the characteristic features of childhood activity. This greed is liable to interfere with the rights of others. Its satisfaction is possible only by aggressive behavior.

There also exists an immediate pleasure in the destruction of objects. There is also a pleasure in reconstructing them. In order to build, however, it is necessary to destroy. Destruction might be a direct aim, although not a final one.

The case history of Nora (*G.2*, see pp. 470-473) shows an aggression which is immediately directed against the integrity of the other person's body. She tended to inflict pain and discomfort as the first step on the way to more complete destruction. It may be that she inflicted pain in order to have a sense of power, but unmistakably she was delighted when she succeeded.

It is very probable that in the world of the child the obvious destructive tendencies directed against others are not the final aim. Children expect that the destroyed object will be restored. According to the experiences of Schilder and Wechsler (15), who have studied the attitude of children toward death, even death is not final for them. It appears to be reversible. The child considers death chiefly as deprivation, due to an act of violence. "Dismemberment is the most obvious means of deprivation. Since it knows deprivation primarily as a consequence of ill-will and hostilities of others, it does not hesitate when ambitious to punish others, to entertain violent ideas of death towards them." Since the child needs the other person, it has a decided wish that the integrity of the other person should be restored. There is a real bond of sympathy which urges the child to seek and favor reconstruction of the other person's body.

In the play of children, especially under nine years of age, the dead soldiers arise again. The suffering of another human being is in a deeper sense also present in the aggressor. From this point of view, the child wants to restore the other person and to relieve his pain.

The child very early experiences punishment as a result of its own aggression. The child fears to be deprived of food. He requires continuous support and help, since his muscular coordination is imperfect, and since he is uncertain in his struggle for equilibrium. If he loses the adult's love (erotic gratification) he may also lose his help. He also fears pain and dis-

membering (encroachment on the body image). He soon learns that he has to check many of his aggressive acts in order to escape punishment. The child feels he is continually threatened. To be sure, children may disregard the dangers to which they are exposed, especially when they have seen that a deprivation imposed by adults is not final.

When children are deprived of parents' love, of their support and food, they experience this deprivation as a direct attack with destructive tendencies. To this they answer with an unbridled aggressiveness as a reaction to the withdrawing of love, as demonstrated in the case of Nora. It is as if this child felt that the deprivation could not become worse, even if she became extremely aggressive. A similar reaction was also present in the case of Rita, but her aggressiveness was specifically directed against a mother who not only had not given her sufficient love, but deprived her of the love of the foster mother.

In general, it seems that the withdrawal of love increases aggressive tendencies in children. Psychoanalysis would speak about the diffusion of instincts, with destructive tendencies coming into the foreground. It is preferable to remain closer to the descriptive facts. The child who is deprived of love tries to get satisfaction from other sources and starts with his destructive search. He has learned, in addition, that the deprivation which he may receive as punishment is not so severe as previously feared. He not only receives satisfaction by embarrassing the adult, but receives more attention.

Pat (*B.17*), a foundling eight years of age, developed enormous outbursts of rage whenever he felt that he did not receive enough love, especially motherly love.

Withdrawal of food may have a similar influence. Nora was decidedly undernourished and retarded in her growth. She was a nutritional problem, due to early deprivation of food. We had, in two other cases, the decided impression that severe nutritional problems with retardation in growth were factors in increasing the aggressiveness in children. Dissatisfaction with food leads to destructive tendencies. In the case of Johnny, a five-year-old boy, dissatisfaction was partially in the form of jealousy against a brother 18 months younger. There was a well-directed tendency to kill and destroy him as well as two other siblings who came later.² This boy was not only undernourished but dwarfed. One wonders if it were possible that he knew at 18 months (the time when the younger brother was born and the aggressiveness started) that his body was going to be too small and that he reacted to this as a serious deprivation. We know that his parents considered him as retarded in growth and undernourished. He must have felt this double deprivation.

At any rate, aggressiveness appears as a reaction to deprivation, which is understandable since the child always feels that deprivation is inflicted by ill-will. In this sense, this aggressiveness is reactive and an an-

²This case was probably one of masked hypothyroidism. [Cf. Dorff (5).] The two other cases mentioned suffered from Cœliac disease.

swer to the aggression of the others. The results of this study closely tally in this respect with the results obtained by Keiser and Schilder in aggressive criminals.

Aggressiveness of children is from the beginning checked by the forceful counteraggression of the adult. Even if the adult is not completely successful in suppressing the aggressive actions of the child, the child soon learns that there are good and bad actions. The bad ones are those for which one gets punished. This simple moral orientation thus becomes the pillar of the social psychology of the child. Many of the decisions of adults appear to the child as completely arbitrary. Good and bad are merely actions which the adult, with executive power, likes or dislikes. The child decides to be good in order not to be exposed to any deprivation. The child is, therefore, utilitarian in its attitude. When children provoke punishment by their aggressiveness, they react merely to a deprivation which is unbearable. Even when children act contrary to the order of the adult, they have a strong feeling of guilt and consider themselves to be bad.

They accept, at least verbally, the morality of adults. At any rate, they need a system of simple moral orientation. Due to Freud, we understand this process. The outward force becomes incorporated in the ego by force of identification and the super-ego condemns the actions which previously have been punished by the adult.

In order to understand the morality of children, one must try to understand their attitude towards the world. Their world is a narrow one. They live in the imme-

diate present, and do not coordinate a great number of facts. It is difficult for them to determine what is good and what is bad in the adult sense. Guided by immediate impressions, they change their moral orientation often. Actions which are alike for the child are different for the adult, and vice versa. The world of the child consists of arbitrary actions of human beings who do something because they like to. The child does not understand his own or others' aggressiveness. Human beings are bad because they like to be so. The child wants certainties. One should be punished and should be punished severely. As Piaget has indicated, the punishment is expected to be proportionate to the actual damage caused by the wrong-doing. The motive is less important from the point of view of the child, or it feels rather sure that any damage wrought is wrought intentionally. He feels every deprivation with equal severity. Death is a deprivation like any other. The child, therefore, does not think that the death penalty is a particularly severe punishment.

These general principles are derived from our clinical observations, as well as from the description of pictures and from the questionnaire. It is worth while, however, to discuss more in detail the material offered in the questionnaires.

The questions Nos. 1, 2, 3, 6, and 7, which ask for a response on basic connotations, call forth answers from children which clearly show that their thinking does not concern itself with the finer structure of things. Courage means to them, for instance, "Somebody who fights" or "You are big." A coward means "When you

fight" or "If a boy is fighting he takes a rock and throws it." Some children believe that a coward, a cow, and a cowboy are more or less synonymous. The partial identity of sounds (signs) is sufficient to make them believe that they mean the same object. Children do not differentiate between the connotation of strength and health. They use these connotations more or less at random. The child tends to understand the emotional implication of a word rather than the cognitive. The child feels these uncertainties of his intellectual orientation and he tries to escape from them by going back to the single experiences. The same difficulties are observed in their perception of pictures. Younger children do not correlate the various details. Partial similarities, for instance, as Piaget has shown, often stand for complete identity. Young children do not make a differentiation between question No. 4 (Do you like to hit other children?) and question No. 5 (Is it right to hit other children?). Children are generally taught not to hurt smaller children. They themselves are afraid to be hit by bigger ones. They come, therefore, to the obvious conclusion that it is probably all right for them to fight with somebody of equal strength. It is very interesting that this attitude also persists among adults (Keiser and Schilder and questions No. 8 and No. 9). Hitting of a girl by a boy, or hitting a smaller child, is similarly rejected since girls are better protected by the rules laid down by adults. But aggressiveness of the smaller child, insult by the smaller child, especially those directed against the parents, and, finally, the greater strength of the girl justifies

aggression even in these cases (questions Nos. 10, 11, 12, 15).

To strike back on attack is generally considered as correct, which is also true in adults (Keiser and Schilder and question No. 14). Even small children who show their aggressiveness plainly in play do not freely profess their murderous wishes unless there is a specific reason. Preference for the gun as an instrument of killing is already present in the smaller children. This is partially due to the generally acknowledged greater effectiveness of this instrument and partly due to the feeling that killing with an ax is more bloody and violent (questions No. 19 and No. 20). Even smaller children justify aggression against gangsters.

It seems to be the general trend of development that aggressiveness is very soon covered up and dares only to show itself as reactive aggressiveness, as when attacked, or as aggressiveness against those who have sinned, or against those who belong to another social group (Indians, Germans). Aggressiveness thus becomes organized into the general social structure. The comparison between the answers of the younger age group and of the older age group gives a rather clear insight into this process of organization of aggressiveness which takes place in words more readily perhaps than in deeds. A great amount of aggressiveness finds its expression in play when a child has already obtained a higher degree of morality, at least in words.

Popular psychology considers boys more aggressive than girls. Passivity has even been considered as a feminine characteristic, and it has been said that maso-

chistic trends are the basic ingredients of female psychology. Our questions Nos. 10, 11, 16, 17, and 18 refer to these problems. Only small children readily accept the idea of change to the opposite sex. Seemingly, the difference between girl and boy does not mean very much to them. But that there is some deeper meaning in their willingness to change their sex readily is evident from the case history of Milton (*B.3*) in which passive and masochistic elements are outstanding as a result of his relationship to his mother. All children around the fifth year develop a great pride in their respective sexes; this increases with age. The reasons which they give for their preference, in both sexes, are very superficial. One girl wants to be a girl because a girl has more hair; another one because a boy can't sew; another one doesn't want to be a boy because boys are fresh; another one because the boys go to war; and still another one prefers to wear dresses instead of pants. Boys want to be boys because they want to play baseball and football; because they don't have to wear dresses; because the boys have more fun; and because the girls have too much housework to do. In our whole material there is only one boy of the older age group who says he would prefer to be a girl in war time. Our material does not offer any evidence that girls would prefer to be boys. One may have doubt whether the questionnaire method is sufficient to exclude a deeper-lying penis envy as one of the roots of female psychology. But our cases are also individually studied, although over a comparatively short time. We do think, indeed, that the classical Freudian con-

ception of the castration complex in girls is not justified and that our questionnaire comes close to the deeper-lying facts.

It is true that girls are considered by boys as well as by girls to be weaker, and should, therefore, have the protection otherwise given to the smaller child. The answers to question No. 16 show the vagueness of connotations of children. In the younger, as well as in the older children, a sissy is a boy who goes with girls; a boy is like a cat; a boy that fights girls is a "show-off"; a boy who can't fight, a boy who dresses like girls, boys who play around with girls, and anybody who can't fight or who is afraid to fight is a sissy. With the exception of Milton (B.3), all the children expressed a definite dislike for sissies. The general definition of a sissy for children would be a boy who, in his relations to girls and fighting, does not live up to the social standards. These answers of children show clearly how so-called *secondary and tertiary sex characteristics* are arbitrarily attributed to the one or the other sex. The answers of children show the strength of the social conventions, and have justly pointed to the importance of convention for the determination of masculine and feminine.

If one considers the differences between the younger and older children in the problem of aggressiveness, one sees that the chief difference is in the better coordination of the different parts of the problem. The younger children want immediate satisfaction and are in immediate fear of punishment and retaliation. In the older children, the idea of right and wrong gradually

emerges and is independent from their idea of immediate advantage and disadvantage. The youngest age groups dare to express their pleasure in aggressiveness freely, while the older age groups must resort to play, to reactive aggressiveness, and to the idea of punishment of others for sinning. Only in the particularly gifted individuals of the highest age group have doubts arisen as to whether aggressiveness is justified under any circumstances, as in the case of Max (B.22), nine years of age, with a mental age of 16. We do not have the impression that we deal with abrupt changes in the psychology of the different age levels, and we have separated the groups between the ages of eight and nine in a rather arbitrary way. We have the impression that we deal with a process of gradual organization in which the attitude of the surroundings is of paramount importance. Nature is continually modified by nurture. The case histories we have reported show the influences of the home situation and the psychological problems of the child on the final crystallization of his aggressive attitudes. We want to emphasize that we have not merely put the questionnaire before a group of children and supplemented it by play and picture interpretations; every child of the group has been studied individually concerning his aggressiveness. It is astonishing that in a great number of cases the actual behavior of the children does not differ particularly from what they express in the questionnaire. In the very young children there is an almost complete coincidence; in the older group the verbal morality is very often higher, but still in the aggressive children the

aggressiveness very often is expressed rather clearly. Perhaps the term "aggressive child" is an illegitimate generalization. Children are very often aggressive at home and not aggressive in the hospital. Or, in other words, we should not speak too readily about the general quality of aggressiveness. Aggressiveness occurs in specific situations. It is true that there is a general drive, a general activity in handling objects, which we tried to characterize in the beginning of the discussion. It is difficult to draw the borderline between activity, which is a general characteristic of life, and aggressiveness. We speak generally of aggressiveness when the activity leads to an encroachment on the physical integrity of others. This aggressiveness is mostly combined with destructive actions concerning other animated and inanimated objects.

This activity in aggressivity has a close relation to motor drives and to instincts in general. It doubtless has its foundation in the organic structure, and its variations are in close relation to the constitution. Organic processes may influence the general output of energy. The hyperkinetic child shows a great increase not only in activity but also in aggressiveness. His hyperkinesis can be due to constitutional factors, encephalitis, or birth injuries and head traumas of all kinds (3). Two instructive cases are the Moon brothers (*B.20* and *B.34*) where constitutional components play a great part. In the more severe case of the older brother, a head injury at birth may have played an additional part. But even in these two cases, psychological factors played some part as a reaction

to neglect by an unstable mother. It seems that with constitutional predisposition psychic traumas can lead to a general increase in activity and to hyperkinesis. It is characteristic that this hyperkinesis leads to a rather diffuse aggressiveness and destructiveness. In the majority of cases, psychic traumas lead to a direct aggression which expresses itself in a specific situation, for instance, at home or against a younger sibling only.⁸

The criticism might be made that we have studied abnormal children. We cannot deny that our material is not as homogeneous as that from so-called normal children would be. On the other hand, the majority of our children were not diseased and were not more abnormal than many children who attend the schools. We contend that the children we studied showed the same problems as do normal children. The particularly difficult circumstances under which many of them had lived tended to focus attention on many specific trends more clearly than would be the case in a so-called normal group. We do not think that this group of children was qualitatively different from a so-called normal group. We have repeatedly emphasized that even an organic brain lesion does not create fundamentally new trends but it merely underscores specific psychological problems. The heterogeneous character of our material makes a statistical study impossible and

⁸Since this paper was written there have appeared two publications by David M. Levy on aggression in children in relation to various family situations and organic conditions: (1) Hostility patterns in sibling rivalry experiments. *Amer. J. Orthopsychiat.*, 1936, 6, 183; (2) Aggressive-submissive behavior and the Frölich syndrome. *Arch. Neur. & Psychiat.*, 1936, 36, 991-1020.

we were obliged to content ourselves with a qualitative description. We think, therefore, that the conclusions to which we have come on the basis of so-called pathological material are valid for the child in general.

H. SUMMARY

1. This is an investigation into the psychology of aggressiveness in children, based upon the clinical observation of 83 children between the ages of three and fifteen years. The problem of physical aggressiveness was studied. We considered violence to be any action which damages the body of another person or distorts his body image by pain or discomfort. The children were not only observed clinically but were subjected to a definite play situation, to series of pictures depicting aggressive situations, and to a questionnaire on aggression.

2. Aggressiveness finds expression more directly in younger children, in actions as well as in play, in words, and in the description of pictures. Young children seek immediate satisfaction and are in immediate fear of punishment and retaliation. The narrowness of their world does not allow the coordination of a great number of facts. Good and bad in the adult sense is more or less an arbitrary decision of the adult. Deprivation of love or food increases the aggressive tendencies of children.

3. In all the children, there gradually emerges the idea of right and wrong, dependent on immediate advantages and disadvantages. The youngest age groups express their aggressiveness freely, verbally and in

play, but the older age groups are inclined to be inhibited, and often a play situation or other indirect method by which they can unconsciously express their aggressiveness in the idea of the punishment of others for their sins is needed. Aggressiveness against a group is expressed more freely than aggressiveness against single individuals.

4. There is a process of gradual organization of aggressive tendencies into a socially accepted concept in which the attitude of the surroundings is of paramount importance. The psychological situation of the child leads to the final crystallization of his aggressive attitudes.

5. In the youngest children there are no discrepancies between their actual behavior and their answers to questions. In the older group, however, the verbal morality is usually higher, while the aggressiveness finds expression in play and tends to become more or less unconscious and repressed.

6. Aggressiveness has close relations to motor drives and to instincts in general. It undoubtedly has foundations in the organic structure, and its variations may be constitutional. Organic processes influence the general output of energy. The hyperkinetic child shows increased aggressiveness. The aggressiveness on an organic basis is mostly more diffuse, whereas psychic traumas lead to an aggressiveness in relation to specific situations.

REFERENCES

1. ADLER, A. The neurotic constitution; outlines of a comparative individualistic psychology and psychotherapy. (Trans. by B. Glueck and J. E. Lind.) New York: Moffat, Yard, 1917. Pp. xxiii+456.
2. BENDER, L., & SCHILDER, P. Form as a principle in the play of children. *J. Genet. Psychol.*, 1936, 49, 254-261.
3. BLAU, A. Mental changes following head trauma in children. *Arch. Neur. & Psychiat.*, 1936, 35, 723-769.
4. BRIDGES, K. M. B. The social and emotional development of the pre-school child. London: Kegan Paul, 1931. Pp. 277.
5. DORFF, G. B. Masked hypothyroidism in children. *J. Pediat.*, 1935, 6, 788-798.
6. FREUD, S. The ego and the id. (Trans. by J. Riviere.) London: Hogarth Press & Instit. Psycho-Anal., 1927. Pp. 88.
7. ———. Civilization and its discontents. (Trans. by J. Riviere.) London: Hogarth Press & Instit. Psycho-Anal., 1930. Pp. 144.
8. ISAACS, S. Social development in young children. New York: Harcourt, Brace; London: Routledge, 1933. Pp. xii+480.
9. KEISER, S., & SCHILDER, P. Studies in aggressiveness: I. A study in criminal aggressiveness. *Genet. Psychol. Monog.*, 1936, 18, 361-409.
10. KLEIN, M. Psycho-analysis of children. Int. Psychoanal. Library, No. 22.
11. KRAMER, I., & POLLNOW, H. Ueber eine hyperkinetische krankung im Kinderalter. *Monatsch. f. Neur. u. Psych.*, 1932, 82, 1-40.
12. MEYER, A. Zur pathologischen Anatomie der epidemischen Metencephalitis im Kindersalter. *Arch. f. Psychiat.*, 1927, 80, 624-632.
13. MITTLEMAN, B. Fröhlich syndrome. Paper read in the New York Neurological Society, October, 1935.

14. PIAGET, J. The moral judgment of the child. New York: Harcourt, Brace, 1932. Pp. ix+418.
15. SCHILDER, P., & WECHSLER, D. Attitudes of children towards death. *J. Genet. Psychol.*, 1934, 45, 406-451.
16. WITTELS, F. Masculine and feminine in the three psychic systems. *Psychoanal. Rev.*, 1935, 22, 409-423.

III

AGGRESSIVENESS IN WOMEN

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Men are usually thought to be more active and aggressive than women and many persons are inclined to believe passivity is the very essence of femininity and would even include masochism. It is very difficult to separate facts from prejudice in this field, and, furthermore, social custom and habit have apparently had a very great influence on what is considered feminine and masculine (cf. Wittels and others). One might be inclined to emphasize the greater strength of men in comparison to that of women as basic for the psychological differences which are generally considered to exist in men and women, particularly when it is realized that women are weakened at those periods of life which are concerned with the reproductive functions, such as during pregnancy, menstruation, etc. It is true that in our civilization women are weaker than men, but if we believe Briffault (1) and Margaret Mead (3) even this has no universal significance. The former states that there are tribes in which the women are stronger than men. If strength should actually be the difference between men and women, the problem would still remain of why a weaker person should be passive and a stronger person active. In the present stage of our civilization physical strength no longer has any particular importance, since modern weapons overcome any disparity in physical strength. Still, the attitudes of previous generations might continue even

when the original causes are no longer present. If this should be so, the difference between masculinity and femininity would be more or less a social and not a biological difference. One of us has shown that in an analysis of the sex act women are not less active than men. There would appear to be a difference in the time relationship between activity and passivity since the man is more active in the first part of the sex activity and the woman in the second phase. Bender and Schilder have shown that the general attitudes in girls concerning aggressiveness are not very different from those in boys. In a previous study we came to the conclusion that human beings show a continuous flow from activity to passivity. If this rhythmical flow between activity and passivity is interrupted when the individual is pushed into a too passive position, reactive aggression occurs. Aggressiveness therefore is often a protest against passivity. The individual may not be in a passive position in reality but because of the psychological situation may feel that he has been pushed into a passive situation. Social convention is responsible for the frequent linkage of passivity and femininity, and the individual protests with violent aggressiveness against the feminine rôle into which he is forced.

As mentioned by Bender and Schilder, no fundamental difference in this basic mechanism can be found between boys and girls.

Interested in these problems, we have undertaken a study of the aggressiveness of women. We are merely interested in physical aggressiveness in so far as it leads to an impairment of the physical well-being of another

person, or, in other words, to a disruption of the body image of another person. We used in this study both the clinical approach and the questionnaire method which is described in our previous paper. The questionnaire was submitted to a group of normal women, and the results were compared with those obtained in aggressive criminal women and neurotic women.

In 1935, 2475 prisoners passed through the Court of General Sessions of New York County. Of these, 312 were assault cases, 29 murders, 1 kidnapping, 1 manslaughter, 432 robberies, 62 possession of a weapon, 61 rape, and 9 sodomy cases, making a total of 948. During the same time, 115 women passed through the court; of these 15 were cases of assault, 3 of murder, 4 of manslaughter, 2 of robbery, and 4 of possessing a weapon. This totalled 28 and meant that 24 per cent of the women who had committed crimes had committed aggressive ones.

Our material is from the court clinic and the observation wards of the Bellevue Hospital, Psychiatric Division. As the adjoining table shows, 14 aggressive criminal women were examined and 25 normal and 20 neurotic women. Many of the latter were completely analyzed. The outstanding results were as follows.

1. The male and female aggressive criminals view courage as a physical quality. The females who do not do aggressive acts put greater emphasis on the moral aspect of courage. This same attitude is expressed toward cowardice. The aggressive women consider cowardice to be a greater evil than do the non-aggressive ones.

TABLE 2*

Questions	Answers	Non-criminals (Female, 25)	Aggressive criminals (Female, 14)	Neurotics (Female, 20)	Comment
1. What is courage? Give instances	Courage considered as moral quality Courage considered as physical quality	16 8	3 11	11 7	Nearly all aggressive females regard physical manifestations as courage, and also a large percentage of neurotics.
2. What does it mean to be a coward? Give instances	Cowardice is a moral quality Cowardice is a phys- ical quality	18 7	5 8	12 6	Same as above. Cowardice is regarded as a physical quality.
3. Why not be a coward?	Others' opinion Self-defense Not mainly It's just bad Unclassified Hinders in job Not bad to be coward	6	5 1	1 1 3 1 0 7	
4. Do you ever like to hit a man?	Yes No	7 18	3 11	6 14	Six neurotic females admit liking to hit a man.
5. It is ever right to hit a man?	Yes No	15 9	8 6	11 9	Large percentage of all women feel it can be right to hit a man.
6. Should one ever fight with a stronger man?	Yes No	14 11	1 13	12 8	
7. Should one fight with a weaker man?	Yes No	6 19	1 13	7 2	Only neurotics feel weaker men should be hit.

*In Table 2, many of the answers do not total 25, 14, and 20, respectively, as frequently individuals refused answers or they were so complex that they could not be grouped with any of the others.

TABLE 2 (continued)

Questions	Answers	Non-crimeals (Female, 25)	Aggressive crimeals (Female, 14)	Neurotics (Female, 20)	Comment
8. Is it ever right to hit a woman?	Yes No	6 19	9 5	8 15	Most all aggressive women consider it all right.
9. It is right to hit a woman who is stronger?	Yes No	7 18	12 2	9 10	
10. Would you let a smaller man hit you?	Yes No	6 19	6 2	5 18	Only aggressive women will permit weaker men to hit them.
11. Is it right to strike back if hit?	Yes No	22 3	11 3	17 4	
12. When is it right to hit somebody?	Self-defense Never For insults Sexual assault	17 2 5	12 2	13 5	Self-defense again is important factor.
13. Would you like to shoot (kill) somebody?	Yes No	3 22	1 15	2 11	
13A. Is it ever right to kill anyone?	Yes No	25	14	16	The aggressiveness of neurotic women is expressed more freely.
14. Would you like to kill somebody with an ax?	Yes No	25	14	16	
15. How would you defend yourself against a stronger man?	As he does Pick up anything Run away Reason with him Fight Best way Kick in testicles	9 2 2 10	7 1 4	4 6 5 1	One neurotic says she has thought of it.

TABLE 2 (continued)

Questions	Answers	Non- criminals (Female, 25)	Aggressive criminals (Female, 14)	Neurotics (Female, 20)	Comment
16. Are you strong?	Average Yes No	3 18 4	1 6 7	0 14 4	
17. Would you like to be strong? or stronger?	Yes No	24 1	8 6	17 3	Non-aggressive women are afraid to be masculine.
18. Would you like to be weak?	Yes No	1 24	5 11	16 2	Neurotic women are not afraid to be weak.
19. Why is it important to be strong?	Self-defense Manly No importance Useful at work Appearance Shame Sensation of feeling strength Defense against rape	13 4 2 4 20 1	5 6 6 1 12 1	6 8 1 2 3 3 9 6 1	Idea of sexual assault re-occurs with women repeatedly.
20. How often do people harm you?	Often Rarely Occasionally	1 20	2 12	3 12 3	
21. How should criminals be punished?	Present system Therapy Life Death	16 3 3 3	8 1 1	8 6 1	
22. Is capital punishment ever justified?	Yes No	13 12	2 12	12 3	Aggressive women are against capital punishment.
23. Are you good or bad?	Average Good Bad	3 22	4 10	5 13 1	

TABLE 2 (continued)

Questions	Answers	Non-criminals (Female, 25)	Aggressive criminals (Female, 14)	Neurotics (Female, 20)	Comment
24. What is right or wrong sexually?	Nothing is wrong			5	Neurotic females express a more severe morality, and are more vehement in expressions against unconventional attitude.
	Whatever is necessary			3	
	Illicit is wrong				
	Natural way			2	
	Only marriage			4	
25. What do you aim for in life?		Rich husband, home, children, business	Home, teacher, nurse	Home, happiness, shop	
26. Are you a success in life?	Yes	13	4	5	Neurotics do not feel that they are a success, even when saying yes, they qualify it.
	No	5	5	12	
	Don't know	7			
27. What do you want to reach?		Beauty, profession, happiness, knowledge, radio artist	Don't know (2), job	Beauty shop, professional, independence	
28. How much money a week do you need to be happy?		\$50	\$22	\$50	As with men, aggressive women have lower financial ambition.
29. What do you consider a good time?		Night clubs, movies, friend, husband	Dance, movies, reading	Dance, clothes, theater	

TABLE 2 (*continued*)

Questions	Answers	Non- criminals (Female, 25)	Aggressive criminals (Female, 14)	Neurotics (Female, 20)	Comment
30. Should you be a hero?	Yes	7	10	10	All aggressive females want to be heroines.
	No	14	1	10	
31. Who are your heroes?	Lindbergh	Lindbergh		Lindbergh	
	Byrd	Roosevelt		Firemen	
	Roosevelt			Blood donors	
32. Are you good looking?	Average	3	1	6	Most aggressive women do not think of themselves as good looking.
	Yes	8	5	7	
	No	7	8	6	
33. What do you think of war?	Terrible	7	6		
	Unnecessary	2		2	
	Bad	5	3		
	Murder			13	
34. When is war justified?	Never	17	4	6	Neurotics agree with aggressive females that war is justified for self-defense.
	Self-defense	7	9	10	
35. Would you fight in a war?	Yes	7	5	10	
	No	18	6	9	
36. Would you rather be a live coward or a dead hero?	Dead hero	5	9	9	Neurotics seem to prefer to be dead heroes. Those that are equivocal do not want to live as cowards.
	Live coward	18	4	7	
	Equivocal			4	

2. The aggressive criminal woman expresses her aggressive drives towards men less freely than do other women. The former feels more entitled to hit other women than non-criminals.

3. Quite in the same way that men do, women of all categories feel that aggressiveness is justified in self-defense. Women particularly stress the right of self-defense against sexual assault.

4. Neurotic women confess rather freely the wish to kill. This is partially due to the fact that many of them were analyzed and therefore had better insight into their unconscious tendencies.

5. The financial ambition of the aggressive criminal is less than in other women. This is identical with what has been found in men.

6. Women often confess to the use of violent methods of self-defense against men.

7. Criminals feel a greater urge to be heroic than do non-criminals. In this respect neurotic women are less ambitious than the normal group.

8. More of the aggressive women do not consider themselves good-looking than the women in the other categories.

9. As with men, a greater number of the aggressive women criminals justify war on the principle of self-defense.

10. The percentage of women who prefer to be dead heroes to being live cowards is greatest among the criminals.

One sees that criminally aggressive men and women give almost identical answers to the questionnaires.

The one remarkable difference is that the aggressive criminal woman permits a freer expression of aggressiveness against other women.

It is remarkable that in neurotic women, some of whom have been analyzed, the verbal expression of aggressiveness is freer than in other categories of women. A few case histories may illustrate the type of aggressiveness found in criminal women.

A female whose aggressivity was easily expressed in physical violence is a colored female, 28 years of age, who was convicted of manslaughter and had previously been arrested for assault (twice) and robbery (twice), had been held for homicide, and had been convicted of prostitution three times. Each time she had attacked a man, usually a lover, and always with a knife. She was a vigorous type of female. Her sole explanation was that men would bother her so much that she had to do something. To the question, "Is it right to kill?" her reply is that people pick on you so until you get angry and kill them. One of her statements was that, if she were weaker, men would not bother her so much and therefore she would not get into trouble.

This woman feels entitled to self-defense. Owing to her physical strength she feels almost obliged to react with aggressiveness. Society in some way imposes on the physically strong the moral obligation to protect themselves with physical violence when feeling attacked. That the patient follows this unwritten and perhaps unthought-of social code is partially due to social and racial factors. We do not have sufficient knowledge about her early life.

Another prisoner had cut a woman after an argument in which she had been accused of perverse sexual relations with a woman. She was an elderly woman who had recently lost her husband. She had been accused by the victim of homosexual relations, and the colloquial term was used which indicated that she played the masculine rôle. This accusation conformed to rumors which circulated in the neighborhood about her. The examination revealed so-called masculine mannerisms.

It is rather paradoxical that this patient tries to assert her feminine qualities by acts of aggressiveness which are generally considered the prerogatives of men. One clearly sees here that human beings make only a limited use of the symbolism of femininity and masculinity and are ready to discard it under the pressure of self-assertive tendencies.

In our previous studies, we discussed a female patient who protested against the weakness she experienced in the feminine rôle of intercourse and protested with actions of violence. She energetically denied that she was masculine in any way, although measured under present standards she would have been considered as a masculine type of girl. She enjoyed physical activities, boys' games, and work in a gas station.

We would like to present another case history now. *P.M.* was a colored female, aged 28, who was admitted for observation when she had walked out of her house nude. She was described as restless, overtalkative, and circumstantial. There were many references to overt homosexuality and subsequent social difficulties. After

17 days the acute symptoms subsided and she was discharged to the out-patient department.

Her mother had died when the patient was three years of age. The father had died in a state hospital after many years (paranoid?). An aunt had adopted her. She was a college graduate. Marriage at the age of 18 years had lasted for a short time. Intercourse was physically painful and never enjoyable. Homosexual affairs had begun at the age of 17, and at the time of observation she was deeply in love with a passive white girl. Her rôle is the masculine one, and she feels that she should be permitted to proclaim herself openly as the girl's husband and to be married to her. Manipulation of the clitoris produces orgasm for her. She strongly dislikes large breasts and to have anyone touch hers, yet she likes to suck her friend's breasts. In childhood she mostly played boys' games as marbles, hunting, etc. She was too rough for girls in her play.

Two of her dreams were:

I was fighting with a girl on the ward. I fight but the socks do not reach her—but this time I give her a few good socks and she fell on the floor.

The girl friend and I were trying to get together when I was surrounded. We went somewhere, then we got separated. We went to a basketball game in elementary school. The girls took showers—the game turned into a free-for-all fight—a sophomore battle. I had no fear. Policemen fired little things, fire darts. Everybody was firing at me. Finally I met a dwarf with whiskers, naked, on one side of his body was a broken arm, and a long breast. Other side was like a normal man's. No male organ that I saw. He said, "Take me to the fight, touch my beard and wish." I had no wish to make. I brought him to the battle and on the way down we met

another dwarf, but larger. I wished to find my girl friend but bigger girls teamed up to put me out because I was too energetic. I ran away but two of them caught me.

In this case the problem of masculinity and activity receives another turn. The urge for motor activity in early childhood expresses itself as a desire to be a boy. This leads to a tendency to homosexuality. She wants to play the part of a man and gets restless since she can not grow a penis and be a father to children. Her overt behavior does not contain any violent acts although she is very active and energetic in the pursuit of her masculine rôle in relation to girls. In her dreams which we have reported, she fights but her fists do not reach the adversary at first. Later she floors the opponent. The long dream is filled with fighting and an ambiguous attitude towards the male sex organ. It is more than probable that in this case the ideology "boys are active" has led the patient to assume a masculine rôle. The activity leads to aggressivity only in dreams and phantasies.

It is easy to exemplify the problems discussed so far with case histories of neurotic women. A 51-year-old female negress, with a history of many abdominal operations and of convulsive seizures since 19, complains that she hears voices from the right side, that she sees black shadows about six feet tall in back of her, and that there are black animals like cats and dogs threatening her on the right side. The clinical evidence clearly indicates that she is a case of hysteria. She had actually lived out during her life aggressive

impulses. At various times she attacked her younger brother with a knife, attempted to drown him and to smother him. Since she was continually fighting she had to be sent to her grandmother to live. As an adult she made attempts on the lives of her mother, lover, husband, and herself. At the age of three she was on her grandfather's lap when he had a convulsive seizure. At seven cunnilingus was forcibly performed on her. At 15 she was assaulted by a man and became pregnant. During the pregnancy the patient shot herself in the abdomen, killing the fetus. Her heterosexual life was mostly with white men, but at present she greatly resented any sexual approach. In spite of her many actions the patient had never become a criminal. Her aggressiveness is considered by her to be reactive, and the threatening shadows on her right side are a projection of her fears of sexual assault. Her answers to the questionnaire are interesting.

1. Something that makes you not afraid to do anything, e.g., to try to save a drowning person regardless of consequences.
2. To be afraid of people, to be afraid to resent insults by a man on the street for fear he might hit you.
3. I don't know why a person should not be a coward. It depends on the personality of the man.
4. Not just for the sake of hitting them. I might hit anyone if he made me angry, not necessarily a man.
5. If they do something to hurt your feelings, or hurt you bodily.
6. If a person makes you angry, no matter how big they are, you might try to hurt them.
7. Not just because you think you can get the best of them but if they make you angry enough you might.

8. You don't hit anyone just for the sake of hitting her.
9. I don't think it's right to hit anyone just for the sake of hitting them, but if anyone made you angry enough, you might hit her whether she is bigger or not.
10. Not if I could help it.
11. Yes.
12. When they hit you.
13. That depends on circumstances, sometimes when you are angry you do things you wouldn't do afterwards.
14. No.
15. Any weapon I could get hold of.
16. No.
17. I would like to be stronger.
18. No.
19. It's important to work for a living.
20. Not any.
21. Life imprisonment.
22. I don't think so.
23. Good in some ways, bad in others. About average. I'm about average.
24. Prostitution and perversions are wrong. Also intercourse outside of marriage is wrong.
25. To make a good living, have a home, and something for when I get older.
26. No.
27. Same as 25.
28. \$75 a month.
29. Radio, movies, detective stories, murder stories, etc.
30. No. What motive would there be?
31. Roosevelt, Byrd, and doctors who inject poisons into themselves.
32. No.

Obsession neurosis cases show similar problems in an even more obvious way. For instance, the 30-year-old Edna L. has impulses to kill her children. In the genesis of the impulses, the feeling of being insuffi-

ently loved by the mother played an outstanding part. Her associations suggest that she probably felt she was not getting enough milk from her mother. Her older sister was seemingly more loved. Vomiting very often accompanies the impulses of hatred as if the patient would say, "If I cannot have enough milk (love) I refuse it completely and I will become active and aggressive since I don't get enough in a passive oral part." When she is active and aggressive she is guilty of bringing the other person into the passive, immobile dead position. Her first compulsions occurred in connection with the death of a little boy which she witnessed. Since she wants to be active herself the penis is in her way and she dislikes the male sex organ unless it is used in her service, namely, aggressively against women. In her childhood and puberty she had phantasies of men raping beautiful women in a brothel which she owns. If the women disobey her she lashes them. As she assumes partially masculine functions she admires beautiful women. Since her passive greed is not satisfied she wants both the love of her mother and the love of her father. She is jealous of her mother and her daughter. It is rather interesting that the patient does not identify herself with a man. She merely likes the female body and does not like the penis, the substitute of which (the nipple) was unkind to her.

The aggression of this patient which comes out in the compulsion is seemingly the result of deprivation in early childhood. After the aggression has once developed it is chiefly directed against other persons. The patient did not suffer from the aggression of the

parents and siblings. In her parental home, aggressiveness was banned, and, therefore, her aggression meets the resistance of a strong super-ego and comes out merely in petty nagging and in compulsions directed against the children. Her answers to the questionnaire betray a high degree of verbal morality, but wishes and desires to kill have played a great part in her life.

The material in neurotics is merely offered as an illustration of the basic principles which we have met again and again in our studies.

Margaret Mead (3) has found that in some primitive tribes, like the Arapesh, feminine and masculine trends hardly exist. The idea for both sexes is what we should call womanly. They believe that women are stronger than men. They are expected to carry heavier burdens and accordingly they are stronger.

The Mundugumors are aggressive and possessive but the sexes do not differ in this respect. The Tchambuli women are sexually more active. They select and pursue their males. The men wait passively. "The personality traits which we have called masculine and feminine are as likely linked to sex as are the clothing, the manners and the form of head dress that the society at a given period assigns to either sex."

Our own studies concerning aggressiveness show that there is no fundamental difference between male and female aggressiveness. In both sexes it is increased in a reactive way and is a protection against being pushed into the passive rôle. Our investigations do not deal with the related problem of the activity and passivity

in the choice of love objects and in work and occupation. The fact remains that aggressive behavior, especially aggressive criminal behavior, in women is much less frequent than in men. This is partly because they are physically weaker, especially in our civilization, and that nobody expects them to be physically aggressive and strong. It is true that some amount of aggressiveness is expected from a rather physically strong woman and she is inclined to aggressive acts.

Women feel particularly humiliated when they are forced into a sexual situation which they do not like or which is socially not acceptable. Words are in this respect as important as actions. It is rather interesting that our material does not contain instances of assault of women against persons who have attacked their children. It has to be considered that attacks against children are rather rare in our society.

Women who are more bound by convention in the expression of their aggressiveness by direct action express their wish for power very easily in aggressive action of the non-violent type, as nagging, etc. Our studies also show that the verbal expression of aggressiveness is much freer than the expression of aggressiveness by words in men. It is also remarkable that criminally aggressive women express their tendencies to violence least of all in words. We may draw the general conclusion that aggressiveness tries to find some outlet in men and women alike. If this outlet is found in actions, words and phantasies become unimportant. If there is no outlet in direct actions, symbolic actions, phantasies, and words may constitute the possibilities for an outlet.

The final form aggressiveness takes in man and woman is determined by the ideologies prevalent in a given society. In our present civilization, men and women identify activity and aggressiveness as masculinity, and passivity and submission as femininity, and, furthermore, they regard any trend of the other sex as undesirable. Women with a great amount of activity either disguise it or become proud of it, consider themselves as masculine, and transform their instincts into a homosexual pattern.

Social development has succeeded in having women utilize their aggressiveness in a social way and to refrain from violent acts. The statistics of violent crimes obviously support this statement. That women are capable of fighting is demonstrated in the reports of pioneer days. Present ideologies do not permit a woman active bravery; merely passive heroism is expected. The same ideology keeps them from criminal acts of physical violence. Consequently they express their aggressiveness in words and in phantasies. Ideologies change and symbolic expressions of physical aggressiveness are now allowed to woman. They are permitted to fence, to box, etc. Even so, women have learned to forego physical violence without feeling inferior. It is to be hoped that ideologies will be developed which will relieve men of the obligation to commit acts of violence. Perhaps in the same way that women are tending to give up direct aggressiveness without fear of losing caste, men can learn to forego the privilege of aggressiveness without fear of feeling inferior.

REFERENCES

1. BRIFFAULT, R. The mothers. New York: Macmillan, 1931. Pp. 5+319.
2. KEISER, S., & SCHILDER, P. Studies in aggressiveness: I. A study in criminal aggressiveness. *Genet. Psychol. Monogr.*, 1936, 18, 361-409.
3. MEAD, M. Sex and temperament in three primitive societies. New York: Morrow, 1935. Pp. xxii+335.
4. SCHILDER, P. Seele und Leben. Berlin: Springer, 1923. Pp. iv+200.

IV

STUDIES IN AGGRESSIVENESS

LAURETTA BENDER, SYLVAN KEISER, AND
PAUL SCHILDER

Aggressiveness is here defined as an action or the tendency to an action which would inflict damage on the body of another person. The result of such aggressiveness is to disrupt the unity of the other body by hindering its movements, by wounds, or by pain. Aggressiveness is a general human quality which cannot be understood if considered as an isolated entity. It is one of the manifold phases of human activities.

The outward world provokes our curiosity. We look at it, we touch it, and we want to do something with it. This curiosity is the first phase in the process of investigating the world. But it is also a motor attitude connected with specific postures of the body and with instinctive phasic actions. Actions bring us nearer to an object, and if sufficiently near we touch and grasp it. We take hold of an object, overpower it, lean towards it, test its consistency or its physical qualities, weigh it, scratch it, or we may tear it apart. One sees that activity easily leads to destructiveness. Destruction may become the definite aim against an object which might become independent, too active, or, in one word, dangerous. We distinguish between the following psychological steps: to be curious, to be active, overpowering, destructive.

Human beings do not want to be active at all times, but on occasions like to be passive, that is, to be at rest.

They may even prefer to have the others do things for them, and may not object to being hindered, overpowered, forced, or destroyed. In fact they might desire these actions against themselves.

We have reason to believe that in human life activity and aggression alternate in cycles with passivity and submission. In modern psychological discussions one generally stresses the destructive, sadistic aspect of human attitudes as distinct from the erotic. One generally forgets that human activity is basically constructive, not only in regard to the inanimate world but also towards other humans.

There is a desire to put parts together until the object is complete or to finish whatever has been started. Dissatisfaction arises with things that are broken, and pieces are put together until they form a unit. For instance, when a child has played with a rag doll that it has literally torn apart, it will finally want to have it in one piece again. If a child is given blocks or parts of things it will arrange them into units or meaningful objects. Activity also includes the tendency to help others preserve the unity of the bodies. This tendency to help others is as genuine and primary as the destructive drive. Freud has completely overlooked this constructive side of inter-human relations. It is true that he discusses some of these helpful instincts but attributes them to the libidinous tendencies and not to the ego instincts. This is not sufficient since human activity of a non-erotic type is not merely destructive.

Indeed, the cycle of activity and passivity, as described, is very often connected with sexual attitudes.

Naturally activity and passivity are also phases in sexual life, and the terms sadism and masochism are used mostly when the problems of activity and aggressiveness and passivity and submission are linked with sex problems. There even exists a tendency to consider activity as masculine and passivity as feminine. Such an assumption, even when more cautiously formulated, overlooks the fact that passivity and activity are general human characteristics.

The disadvantage of generalization is that it leads to a neglect of the total situation in which people live. Generalizations, like ego instincts and libidinous instincts, have a limited usefulness in a preliminary attempt to throw some light on the known facts. If one delves too deeply into abstractions of this type, one encounters great difficulties which lie not so much in the difficulty of the subject, but in the wrong use of words.

In our studies we have therefore attempted to collect as many facts through as many varied methods as possible. Our investigations in children not only used an elaborate questionnaire but also the description of pictures, a definite play technique,^{*} and careful clinical and analytic observation. In such a study it becomes evident that to talk about an instinct or an attitude independent from the objects towards which the attitude and the instincts are directed is useless. The children's world is a narrow world. The child lives chiefly in the present and consequently its conception of the future is limited from a psychological point of view. It has strong needs which demand immediate

satisfaction. It has not yet learned what the unity of its own body is, nor what the unity of the body means to another person. Therefore it has to experiment. The child puts the soldiers in one row and then throws them down. He holds the soldier against a wall and is astonished when the soldier falls. He tries to learn about the impact. A child will whirl around with his arms and enjoy a circular motion. If he holds his arms outstretched with an object in his hand, he will perform a semi-circular movement as he puts the object on the floor. He pushes the object over and enjoys the impact as expressed by noise. Toys are thrown down from the table. The aggressiveness against simple units comes out very clearly. In the automobile test, a person is run over and children will speak about killing or falling down. The falling of objects becomes generally associated with the idea of death. The throwing down of objects becomes equal to killing. The pleasure of a child in activities of this kind, as well as in hitting and biting, is obvious and is unrestricted up to the age of three. However, many traces of it persist for years. We cannot follow the gradual integration of these aggressive trends with other attitudes, unless we use other methods for study. In a description of pictures younger children are interested chiefly in details. They do not coordinate the different perceptions into a single concept. They express their aggressiveness freely in these pictures, as well as in their replies to the questionnaire. They soon learn that there is a punishment for aggression. In the gradual process of acquiring knowledge of the body and

of the strivings of others, they learn about their own bodies, and to fear retaliation. They are bewildered by punishment, and very often do not understand why the punishment was inflicted. Good and bad in the adult sense is more or less of an arbitrary decision, and a child soon decides that bad actions are those for which one gets punished.

The idea of absolute right and wrong, independent of the immediate advantage and disadvantage, emerges only late in the development. This, however, is possible only when the child has learned to see a greater part of the world and to have a better concept of the future. The more the child realizes that it will meet repudiation and counteraggressions from the adult, the more restricted becomes his aggressive reaction. But aggressiveness will still come out in play, in fantasies, and in opinions. In these fields the child need not fear the retaliation of the adult, and, even when the child has learned not to express aggressive tendencies against the single human being, it will still express the violent tendencies against groups rather freely, as, for instance, against gangsters, Germans, Negroes, and Indians. The child also learns that, where aggression as such is not tolerated, counteraggression is still allowed. A great deal of this counteraggressiveness is now expressed as an answer to the real aggression in others, but if this is not present the child may invent it. In young children, actual behavior, play, and the answers to the questionnaire are parallel. With age, actual aggression is diminished and is expressed merely in play. Later it is expressed

merely in fantasies and finally in so-called unconscious fantasies. Usually their verbal morality is on a much higher plane than their actual performances would indicate. Aggressive actions do not disappear; the child tries either to hide them from the adult or to make them appear as a means of self-defense, which mechanism is tolerated by the adult.

This is a very schematic picture of the general course of the development of aggressiveness in children. The younger child is not only aggressive but is in continuous fear that it might be destroyed by the aggression of the adult who is so much stronger and therefore more dangerous. At the same time the child expects protection from the adult against hostile influences, support (also against falling down), food and clothing, and love. Since the younger child is under the impression, based upon experience, that the adult can give satisfaction to these needs, it considers any deprivation of them as an act of aggression by the adult and reacts accordingly. In fact, the material collected in these studies gives ample proof to any of these statements. Rita, for instance, reacts with strong aggressiveness when her mother does not give her a sufficient amount of affection. The birth of a sibling as in Johnny's case has the same effect. Affection for the child means something very real, as stroking, support, kisses, food, attention. The child also needs free expression for its motor drives, and any restriction of its motility is again felt as a severe counter-aggression. Watson's formulation of rage as a reaction to the impairment of the freedom of movement permits good insight into the problem.

Our observations in children repeatedly show that increasing aggressiveness is an answer to the aggressiveness to others in the sense described above. Aggressiveness is increased by (1) enforcement of passivity,¹ (2) severe punishment, (3) deprivation of food, (4) deprivation of love and clothes, and (5) anything which may threaten discomfort or destruction.

These are the psychogenic factors. Aggressiveness is deeply based upon motor drives which may be increased on a constitutional basis or by organic disease. The post-encephalitic behavior disorders is one of the best instances of this type. In addition, a constitutional hyperkinesis exists which leads to the same increase in aggressiveness, since hyperactivity necessarily increases destructive actions. The attempt of the adult to check hyperkinesis adds a reactive factor to the organic one.

Aggressiveness expresses itself chiefly in the system of striped muscles. Undoubtedly there is pleasure in having power over objects. It would be wrong to single out one group of organs as more important than others. Human beings certainly do not want only to incorporate things into themselves. In other words, the final aim of aggression is not only to eat and to devour the destroyed objects. To have knowledge and to be the master of the fate of objects are also important aims of activity and aggressiveness. We show our superiority by usefulness, and we may also show it by

¹Includes excessive fondling of child by adult.

helping others retain or rebuild the integrity of their bodies, their body images. It would be decidedly wrong to overlook these strong tendencies to the construction and reconstruction of objects (also love objects). No deprivation is final for the child. It always expects that the dead soldier will rise again. Even more than that, this desire to see other human beings in their integrity is a genuine desire, not less real than the destructive tendencies. There is a psychological need to acknowledge an independent world and to reconstruct it if it should have been damaged. Even in destruction we acknowledge this world. In the plays and games of children as well as in their fantasies, destruction is merely one phase. Construction and the regard for objects is the other one. It is interesting in this respect that even younger children answer to the question (No. 9) "Should one fight with a weaker child?" with "no" and say, for instance, "They could fall or I would take the weak ones to the hospital. I would only fight with big boys, the little ones don't know how to fight." The ideal situation is that two fighters should be equally strong so that they could go on fighting, acknowledging each other without annihilating each other. This is also the ideal situation in sagas; for instance, in Waltharius *manu fortis*, in which one hero loses a leg, another a hand, the third an eye, and they all finally become friends again.

Girls are usually considered as weaker, and boys do not consider it fair to hit a girl. Children reduce the so-called psychological differences between boys and girls to a question of strength and they are probably right in this respect.

It has been said that children are criminals, but such a formulation is of course senseless. Human actions and attitudes are what they are merely in a specific social setting and the social setting of the child and the criminal are fundamentally different. It is true that fundamental trends of human psychology are particularly clearly expressed in children, and the understanding of these trends may help in the analysis of the aggressive criminal.

Our studies in aggressive criminals (male) have shown that aggressive action is very often merely a reaction to a passive rôle which the individual feels has been forced upon him. Real weakness in childhood or enforced passivity in childhood play a very important part. Early diseases which cause exclusion from competition are of particular importance. Parental severity or too severe discipline are factors which decrease the possibilities of free movement in the child and so provoke an active aggression which may later result in a criminal act. The passive attitude of the child may be enforced when the child by its appearance, that is, too tall, too short, too fat, too thin, too weak, too ugly, too beautiful, becomes isolated in his group of playmates. The father may seem particularly strong and masculine. Too many caresses may increase the child's sense of passivity. Passivity and dependence may appear under the picture of femininity. Acts of aggression, especially with a gun, help to restore the threatened masculinity. Mouth and especially anus may be linked up with the idea of passivity and femininity of

which the violent criminal action is the negation. The criminal action also counteracts the fear of castration. The deeds of violence are psychologically very often a self-defense. In many of the cases there is special animosity against homosexuals and a tendency to beat them up. Father and mother are very often felt to be the most dangerous aggressors, especially the mother who in the fantasy of the boy is endowed with a penis. The direct study of children clearly substantiates these points and gives us a deeper insight into the many sources of an increase in the aggressiveness of children. Our own material does not contain a single instance where overindulgence in childhood provoked aggressive behavior, but it might be possible that the excess in desires created by the indulgence might eventually be unsatisfied so that deprivation is experienced. Alexander has reported such a case. But this patient is not an aggressive criminal in our sense. His aggressive actions are merely fighting in a partly socially accepted way and his criminal record consists of burglary or stealing. Alexander and Healy stress the oral passivity by spoiling as important factors in their cases. It may be that their material is different from ours in that the criminality of their cases consists chiefly of stealing or burglary whereas our studies are concerned chiefly with assault and physical violence.

Criminal aggressiveness in our cases was almost invariably reactive in its nature. It is a reaction to a present situation and to a situation in childhood. Since cultural influences connect passivity and submission to femininity and activity and aggression to mas-

culinity, the assault becomes a symbol for masculinity regained. The individual protects himself against castration, oral, vaginal, and anal abuse. The present conflicts which finally lead to the aggressive assault are based on an infantile conflict of the type described. The present situation merely brings back the conflicts of the early situation.

A primary increase can be observed only in cases with an organic hyperkinesis. Even then the single aggressive act is very often based upon a real or invented minor aggression of the other, so that the individual feels his action is a counteraction against the aggressiveness of others. One has justly emphasized that aggressive impulses are present in everybody, and the analysis of neurotics shows that very clearly. It is easy to collect a great number of neurotics, especially obsessional cases, in whom the aggressive impulses are on the surface and who still do not commit acts of violence.

One of our patients felt the impulse to cut women to pieces, to slice them and to eat them up. However, no aggressive action was committed. We do not know under what conditions violent impulses become actions. One could believe that the strength of the urge and impulse may be a factor. We have no objective methods of measuring the strength of an impulse. In post-encephalitic cases one has a measure of the output of motility which is actually observed. It is true that post-encephalitic children are more aggressive than others. The adult post-encephalitic is very rarely aggressive in our sense, but criminal actions are observed

in adult post-encephalitics who acquired their encephalitis in childhood. We have observed a great number of obsessional neurotic cases with signs of hyperkinesis, but they were not criminals. The increase in motor impulses is merely one factor which may determine an aggressive action. We also have no standardized measurement with which to appreciate the strength of sexual drives and sadistic attitudes in so far as they do not express themselves in motility. Many of the criminals studied were unable to coordinate their impulses in a unified goal. They showed in the psychoanalytic sense a weakness in the structure of the ego. In many of the criminals studied this structure seems to have less inner coherence. If, according to Freud's expression, the ego is an organization, it is the organization which is weakened in these cases. An impulse becomes action merely in relation to those forces of organization in the personality. This organization is disrupted in some of our cases of alcoholic intoxication. Early libidinous conflicts may prevent the development of a definite organization as William Reich (3) has especially pointed out. Long drawn-out physical illness in early childhood may have a similar influence. Poor intellectual ability is itself the sign of insufficient inner organization.

Aggressiveness leads to criminal acts when the urge, in relation to the organization of the ego, is too strong. The ego gains its final structure merely through social contacts. One may even go further and say that the nucleus of the ego is a social function. Whether and how far the ego can be organized depends upon the

child's environment. The economic status of the family, its standing in the community, their friends, the attitude of the children in the neighborhood, the attitude of father and mother to social problems, and the attitude of father and mother towards each other and towards the child are of equal importance. We would venture to say that the aggressive impulse has a much greater chance of becoming criminal action when the criminal action can reckon with open or tacit approval of those social forces which play a part in the ego formation. We mentioned in our previous study that the emotional flatness the criminal displays, his inability to judge the future, is a sign of an impairment of the ego system which is, in some cases, the result of early libidinous conflicts. In other cases, weakness of the ego system may be primary or may have an organic basis.

Freud is inclined to believe that criminal actions may originate on the basis of narcissistic attitudes in which there is no tension between ego and super-ego. The chief interest in this type is directed towards self-preservation, and the ego has a great amount of aggression. We did not find the types as described by Freud (1) in our material. The cases we observed reacted to a threat with counteraggression.

We observed only one case of alleged aggressiveness in whom no feelings of inferiority and insecurity were present. He was charged with homicide during the course of holding up a man. His sister described him as a quiet but quick-tempered person. The patient denies the charge and says, "My picture was picked out

by some people." "A man was robbed and shot in the stomach. They showed my picture around and I was told they identified it. The parole officer told me about it. I can trace all my movements. The man who was shot identified me. In prison I had a peculiar feeling. I felt it was an injustice. I was afraid to trust myself and that I might seriously injure someone. I was afraid of myself and I wrote the warden about it. If I had stayed there 48 hours longer I certainly would have gone out of my mind. You feel like you would slap a man down with the least provocation. I am not excitable but am sensitive."

The early history about which many details are known is uneventful. "I hit many kids. If anyone looked at me cross-eyed or stepped on my feet, I knocked them down." The patient has a frank and agreeable personality. There were no feelings of guilt in him.

The observation remains incomplete and it is after all not definitely proven that he committed the criminal act. He is self-contented and self-assured. His personality is well organized and he is even capable of deep attachments.

Criminality is, according to Alexander and Healy, more common in this country than in Europe because a criminal receives more publicity, and they are inclined to believe that the European criminal tries less to assert his masculinity than the American criminal. They speak about the heroic exhibitionistic evaluation of criminal deeds in this country. They think that a strong restriction in individual life leads to a deep

sense of inferiority. We do not think that the aggressive criminal here and abroad shows mechanisms which are fundamentally different. The aggressive criminal restores his prestige in the criminal act. The answers to our questionnaire show that a criminal has a greater esteem for heroism than the non-criminal. We deal here, however, with a general characteristic of a personality which is inclined towards aggressive action. It should be emphasized that aggressive criminals put particular emphasis on physical strength. They are particularly fearful of being considered cowards.

It has been emphasized that the aggressive criminal act is a protest against passivity and enforced submission which are considered as a feminine rôle. But what about aggressive female criminals? Crimes of violence in women are comparatively rare. Among 2475 which were tried in the Court of General Sessions in the City of New York during 1935, only 115 were women, 28 being charged with such aggressive crimes as assault, murder, and manslaughter. Is the psychic mechanism different in women? Our studies in children show that no fundamental difference exists between boys and girls concerning the basic aggressive tendencies. As far as one may conclude from ethnological material (Briffault, Margaret Mead) no fundamental differences exist in the basic qualities of aggressiveness in men and women of primitive peoples.

When one analyzes women, especially of the obsessional neurotic type, one finds the same destructive and aggressive tendencies as in men. If there is any difference in the aggressiveness, as far as it is expressed in

words and fantasies, it seems to be on the whole greater than in men. If one considers further that according to Melanie Klein and our own investigations the amount of aggressiveness in children is the more appalling the younger they are, one might come to the general conclusion that the aggressive drives express themselves more strongly in words, plays, and fantasies, the less the individual has the opportunity to execute them. Our whole discussion, furthermore, points to the idea that the aggressive action takes place when the individual feels restricted in his power to an adequate mastery of the situation. If the aggressive action is checked, the aggression will come out in an exaggerated way in words, plays, or fantasies. If the female aggressiveness actually expresses itself more strongly in this way, this is merely because they are more restricted in violent actions than men. The female aggressive criminal feels, in the same way as her masculine brother, the need for courage as a physical quality.

According to our questionnaire also females stress the necessity of self-defense. Otherwise aggressive criminal women profess less aggressiveness than non-aggressive women. Normal and especially neurotic women express their aggressiveness much more freely. Female aggressiveness serves, as the analysis of neurotics and criminals shows, as a method against being pushed into a passive rôle. Women feel particularly humiliated when they are forced into a sexual situation which they do not like and which is socially not acceptable. They also react very strongly to verbal insinuations of this type.

That aggressive action in women is comparatively rare is partially due to the fact that they are, or believe they are, physically weaker. It is also due to the fact that physical aggressiveness does not enhance the prestige of women and is not demanded from them by social custom. Women also identify activity and aggressiveness with masculinity. Motor activity in girls leads them, therefore, to assume the masculine rôle, and they might accept the part of active homosexuality merely on the strength of the social prejudice that activity and masculinity are linked with each other. If a person who has assumed, on the basis of her motility a masculine rôle, is afterwards pushed into a feminine rôle, the protest may become particularly violent even if the individual, in her own estimate, considers herself as heterosexual. One sees that men and women protest in a similar way against passivity although men and women alike want to be passive from time to time. We might even go further and say that men and women alike want to be submissive for a longer or shorter time. There are the same basic human qualities in both. Women also protest by violent thoughts and deeds when forced into submission. However, women do not feel more feminine when they have been raped or beaten and they also do not feel changed into men by these procedures.

Since our society considers women as inferior there is no ideology extant of what they may become when their value is still further diminished. Comparing aggressive crimes in men and women, one sees that there is no justification for the current idea which con-

nects sex characteristics with variations of the cycle of activity and passivity. These variations are not sex-linked. There is a continuous flow, almost rhythmical in character between activity, aggression, and passivity and submission. These human qualities which are not primarily sexual may be expressed in a sexual sphere. If the sexual sphere becomes their predominant outlet we speak of sadism and masochism. If the rhythmical flow between activity and passivity is disturbed by enforced passivity, activity and aggression is increased. This increased aggressiveness and the enforced submission may originate in the sexual sphere or may originate outside of it in the narrower sense. Aggressiveness will be shaped according to the ideologies prevalent in a social setting. If one has chosen a submissive attitude, that of the so-called passive homosexual, the aggressiveness does not disappear but will reappear in fantasies, thoughts, and actions, either in a direct or in a symbolic way. The aggressive action may become destructive for the integrity of the body of others when the urges are too strong, when the social setting and the ideologies favor such actions, and when the individual is not able to organize his impulses in accordance with the total social situation, especially if he has adopted an extreme type of passive life. Thus, anything which alters a free flow from activity to passivity will fundamentally affect social attitudes.

If we want to prevent aggressive crimes we must bring human beings into situations which would allow them to retain their self-esteem. We must give them the opportunity of identifying themselves with a con-

structive society; we must bring them into surroundings which support the organization of the ego. We must also liberate the individual from the wrong conception that only activity and aggression are valuable; we must clarify their ideologies concerning masculinity and femininity. We must not ask that they should completely repress their aggressiveness. We should provide methods so that their aggressiveness will find an outlet in play and fantasy and in constructive work. If we do so we shall perhaps not only prevent criminal aggressiveness but also neurosis.

REFERENCES

1. FREUD, S. Über libinöse Typen. *Int. Zsch. f. Psychoanal.*, 1931, 17, 313-316.
2. ———. The ego and the id. (Trans. by J. Riviere.) London: Hogarth Press & Instit. Psycho-Anal., 1927. Pp. 88.
3. REICH, W. Der triebhafte Charakter. Wien: Internat. Psycho-analyt. Verlag, 1925. Pp. 132.

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structive society; we must bring them into surroundings which support the organization of the ego. We must also liberate the individual from the wrong conception that only activity and aggression are valuable; we must clarify their ideologies concerning masculinity and femininity. We must not ask that they should completely repress their aggressiveness. We should provide methods so that their aggressiveness will find an outlet in play and fantasy and in constructive work. If we do so we shall perhaps not only prevent criminal aggressiveness but also neurosis.

REFERENCES

1. FREUD, S. Über libinöse Typen. *Int. Zsch. f. Psychoanal.*, 1931, 17, 313-316.
2. ———. The ego and the id. (Trans. by J. Riviere.) London: Hogarth Press & Instit. Psycho-Anal., 1927. Pp. 88.
3. REICH, W. Der triebhafte Charakter. Wien: Internat. Psycho-analyt. Verlag, 1925. Pp. 132.

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